# RISK, TRUST, AND GROUP IDENTITY: ETHNIC AND RACIAL PERCEPTIONS OF ENVIRONMENTAL HAZARDS

By

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Abstract of Dissertation Presented to the Graduate School
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RISK, TRUST, AND GROUP IDENTITY:
ETHNIC AND RACIAL PERCEPTIONS OF ENVIRONMENTAL HAZARDS

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Evidence indicates that racial and ethnic minorities in the United States are frequently exposed to more environmental hazards than the general population. However, few empirical studies clarify how ethnic and racial experiences affect concerns about environmental risk. These concerns have significant implications for policymaking and for politics. Grassroots organizations, such as the Environmental Justice Movement, have evolved because minorities view their exposure to environmental risk as being strikingly different from the majority of the population.

Policymakers need to consider such group-specific concerns when communicating risk to the general public. Risk communication studies indicate that trust is of central importance to such communication, but current research shows trust in government has declined. This is markedly true with regard to ethnic and racial minorities who, because of

higher levels of exposure to environmental risks and concerns about environmental racism, may have more reason for their lack of trust

This dissertation focuses on how ethnicity and race influence perceptions of environmental risks which in turn effects trust in government and social institutions. Focus group data comprised of interviews with African-American, Asian-American, Latino, Native American and white individuals living near six Department of Energy nuclear weapons sites undergoing environmental cleanup is examined through content analysis. The Consortium for Environmental Risk Evaluation (CERE) conducted these focus groups in 1994 and 1995 for the U S Department of Energy. The data provide characterizations of environmental concern across ethnic and racial groups and pinpoints social and political institutions that have the trust of each group.

Given differences in concern about environmental risk and the institutions in which different groups invest trust, effective communication between public authorities and citizens requires attention to the appropriate intermediary in risk communication. To the extent to which public agencies recognize differences between whites and nonwhites, among racial and ethnic groups, and *within* each ethnic or racial group and subsequently improve citizen access and involvement, the legitimacy and effectiveness of government may be enhanced.

# CHAPTER I
# INTRODUCTION

> It is an atomic bomb. It is a harnessing of the basic power of the universe. . . . It is the greatest thing in history.
> (President Harry S. Truman, August 6, 1945)

> At some point this American nation state, this government has to start listening to some of the things we are saying from our perception. Because we still have the ability to communicate with our Sacred Father and our Holy Mother. They tell us things and they can. If any of those people in the government are, if any of them have a little part of being human left and haven't been totally absorbed by this cancerous system, if they have any kind of heart, or soul, or feeling then maybe, what I'm saying right now, maybe one who has some ears. Maybe one will listen. And if so, if it's one if it's ten that will listen then we have some people that we would like to introduce them to. So they can learn the answer to these big destructive mistakes we are making because their people are underlying too. But meanwhile they put us on the frontlines because they take it out of our communities. They process it in our communities. They test it in our communities. And then when they don't know what to do with the waste they want to dump it back into our communities. So I think that if anybody's voice should be heard about this it should be the Indians. (Native American Woman, Rocky Flats)

Technological progress comes at great costs: America's cold war nuclear arsenal caused significant environmental degradation and a lingering problem. A changed political climate and the magnitude of the damage at some of the facilities used to produce nuclear weapons made environmental restoration imperative. However, assessments of the risks posed by these sites are inconclusive; the costs of cleaning them up are astronomical, and

technologies do not yet exist to handle and dispose of some of the wastes. The uncertainty and problems inherent in such cleanups have led many to call for greater inclusion of the public in determining risk priorities. Further complicating matters, officials at all the nuclear weapons facilities have communicated misinformation about risks--in varying degrees--to affected citizens and workers. A climate of fiscal austerity now necessitates that cleanup operations be ranked in priority order, but the history of miscommunication and attendant lack of public confidence in the authorities charged with managing these facilities make direct citizen participation in the assessment of risks and the setting of priorities tremendously important.

Can uniform public concern about this environmental remediation be assumed to exist? The answer is critical to policy decisions and the difficulties involved with this cleanup because agencies are increasingly including the public in their decision-making, implementation of initiatives, and evaluation of existing policies. Scholars have documented differing concern about environmental risks between scientists and laypeople (individuals without scientific expertise), women and men, liberals and conservatives, young and old, whites and "nonwhites."[1] It makes sense that the socially heterogeneous United States would harbor a variety of views of environmental risk. How can policymakers incorporate a multitude of sometimes contradictory viewpoints in new policies, how can differences be resolved, and how may all views be effectively heard? In particular, minority and lower-income individuals rarely find themselves included in the

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[1] Fischhoff et al. (1983) and Flynn et al. (1993) document differences between experts and laypeople. Greenberg and Schneider (1993) find variation in women and men's perception of risk. Wildavsky and Drake (1990) suggest differences between liberals and conservatives. Kanagy et al. (1994) find differences among age cohorts. Savage (1993) and Flynn et al (1994) document differences between whites and nonwhites

political process; yet, these traditionally underrepresented groups may have substantially different views of the environmental risks to which they are exposed than the rest of the population and they are gaining political influence.[2]

This research project has several related objectives. It considers the views of environmental risks held by various segments of the policy-relevant population and investigates the extent to which minority groups hold substantially different views than the majority white population. Specifically, what are the relationships among such factors as minority status, concern about environmental risk, and institutional repositories of trust during risk communication? How do ethnicity and race influence perceptions of environmental risks, and to what extent do these perceptions, in turn, affect and reflect trust in government and other social institutions? Do these perceptions influence preferences for cleanup strategies? Substantial evidence indicates that ethnic and racial minorities suffer greater exposure to environmental hazards than does the general population. Such grassroots organizations as the Environmental Justice Movement arose precisely because minorities view their level of exposure to environmental risk as being markedly higher than that of the bulk of the population. This study deals with the consequences of those perceptions.

This analysis employs a unique dataset that allows race and ethnicity to be assessed as important variables in measuring concern about environmental risk and determining who individuals trust to communicate information to them about risk. This dataset includes interviews with focus groups constituted exclusively of African-American, Asian-American, Latino, Native American, and white individuals living near six Department of

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[2] See the discussion of the Environmental Justice Movement (EJM) later in this chapter.

Energy nuclear weapons sites presently undergoing environmental cleanup operations. Previous studies document different perceptions of environmental risk between whites and "nonwhites": this project disaggregates the broad category "nonwhite" into sociologically meaningful groups to suggest the existence of important differences among ethnic and racial groups respecting their perceptions of environmental risks as well as the entities that they trust to communicate information about those risks. Intuitively, one expects that risk perception is influenced by how risks are communicated and who communicates such information

## The Nuclear Weapons Complex

In 1939, Niels Bohr, a Nobel Prize-winning physicist, cautioned that creating an atomic bomb would turn the United States into "one huge factory" (U.S. Department of Energy, 1995, 2). Enormous resources--material and human--poured into the atomic bomb because the "Manhattan Project" was deemed to be vitally important to national and global security. The Pentagon's sense of urgency to harness nuclear explosives stemmed from the fear that Adolph Hitler's Germany might perfect them first. The Axis powers lost the race, and America built an atomic bomb in three years.

After World War II, mounting tension between the United States and the Soviet Union led to the Cold War and the proliferation of nuclear weapons. The nuclear arms race lasted for decades, spawning "the nuclear weapons complex" which produced, researched, and tested America's nuclear weapons. The complex included test grounds, national laboratories, production facilities, and warehouses (even ones in downtown New York to store uranium). At its zenith, the complex had 16 major facilities and large land

reservations in South Carolina, Washington, Nevada, and Idaho. Over a period of 50 years, the nuclear weapons complex detonated more than 1000 nuclear warheads. From the Manhattan Project (1942) to the present, the United States spent nearly $300 billion on its nuclear arsenal (U.S. Department of Energy, 1995, 2). Bohr's prediction that the United States would become "one huge factory," in many ways, became a reality.

To regulate this "factory," the United States Congress passed the Atomic Energy Act of 1946 which established the Atomic Energy Commission (AEC). Intended to control the uses and production of nuclear power, the Commission initially oversaw the production of nuclear weapons. However, its domain soon expanded into peacetime applications of nuclear technologies--atomic research and the development of electrical power stations. Heightened public awareness of environmental issues in the late 1960s and early 1970s coupled with concerns about nuclear reactor design, led to the bifurcation of the regulatory agency once responsible for both civilian power generating and weapon making. In 1975, two newly created agencies--the Nuclear Regulatory Commission (NRC) and the Energy Research and Development Administration (ERDA)--assumed the responsibilities of the AEC. The NRC regulated civilian uses of nuclear energy, while the ERDA monitored the nuclear weapons complex. Two years later, a newly created Department of Energy (DOE) assumed administrative responsibility over the complex and continues to act in this capacity to the present.

## The Cloak of Secrecy and the Distrust It Generated

Until the late 1980s, the DOE and its predecessor agencies consistently told the public that its facilities and activities posed no significant threat to the environment or human health. The DOE insisted on secrecy for the sake of national security. As the AEC

observed in a *Report of the Safety and Industrial Health Advisory Board*, agencies responsible for managing the nuclear weapons complex knew as early as 1948 of potential health risks:

> The Atomic Energy Commission isolated its projects, built plants which are a marvel of engineering and guarded them with extraordinary efficiency. Their sins of emission--liquid, solid, or gaseous--were diluted and isolated to what was estimated as perfectly safe, but AEC is now entering a phase in which their operations in this regard will soon be public property and they will be accountable to public health--a very severe critic. . . . In the past [,] to produce atomic bombs during the war certain risks may have been taken in research, production, testing, transportation and waste disposal with the understanding that subsequently more effective control measures would ameliorate these risks and lessen the hazardous conditions formerly created. . . . The ultimate disposal of contaminated waste--sub-surface, surface and air-borne--needs much more thorough study. Even the simplest of such data--recorded periodic measurements of stream pollution below the plants--are almost wholly lacking. Even with such records, present knowledge of radiation and chemically toxic effects on animal and vegetable life is so limited that water supply inlets below plant disposal outlets cannot be unqualifiedly recommended. The disposal of contaminated waste in present quantities and by present methods (in tanks or burial grounds or at sea), if continued for decades, presents the gravest of problems. (United States Atomic Energy Commission (1948) cited in U.S. Department of Energy, 1995, 8)

The AEC ignored concerns that the contamination could "if continued for decades, present the gravest of problems," and, while the Cold War escalated, the agency continued to regard worker and environmental safety as internal matters.

In the 1980s, several citizen groups sounded the alarm about the potential health risks posed by DOE facilities. Even when citizens voiced their concerns, the DOE did not initially address them. Instead, the DOE put substantial funds into publicity campaigns designed to alleviate public fears. Nevertheless, some citizens remained outraged by the DOE and its predecessor agencies' exemption from the laws, regulations, and moral precepts governing other citizens, industries, and agencies. Stewart Udall, a former

Congressman and Secretary of the Interior under the Kennedy and Johnson administrations, remarked on the situation

> How did our country's policy makers justify dealing with their fellow citizens in ways which violate common standards of decency? It was clear that for three decades our nuclear weapons establishment had acted on the assumption that they occupied a special, Olympian niche in the nation's government. Their documents told me that they had conducted their activities as though they were authorized to ignore the laws that governed the lives of other Americans; and, like the apparatchiks in Communist countries, they made and executed their decisions on the assumption that they were the guardians of their nation's security and therefore accountable only to themselves. (Udall, 1994, 20-21)

Udall's indignation can better be understood by examining closely what happened at one nuclear weapons facility.

Rocky Flats. The Deliberate Communication of Misinformation

Why do citizens living near DOE facilities distrust that agency to communicate information about risk associated with its facilities? The experiences of citizens at Rocky Flats led Dora G. Lodwick to chart what she calls the failure to follow through on a duty or trust of government and industry as well as the resultant public distrust at Rocky Flats (Lodwick, 1993, 150). Lodwick considers four periods in the history of Rocky Flats. In the National Security Era (1951-1969), when most of the plants across the country got their start, the public gladly received the facility and trusted government and management. During the Period of Tension (1970-1987), trust wavered as citizens and state politicians became suspicious of health, safety, and environment reports issued from Rocky Flats. The Era of Revelation (1988-1989) saw such suspicions confirmed, and several deceptions revealed. The Struggles of Distrust (1989-1990) resulted in the discontinuation of production; environmental restoration and worker lawsuits became the new foci of

attention at the facility. This chronology parallels developments at many DOE plants across the county.[3]

Lodwick specifies several instances of untrustworthy behavior by management and government.[4] One incident is especially noteworthy. On 6 June 1989, the Federal Bureau of Investigation (FBI) and the Environmental Protection Agency (EPA) conducted a surprise inspection at the Rocky Flats plant. In "Operation Desert Glow," agents instructed workers to continue at their jobs while investigators collected documents and conducted water and soil analyses. The FBI and EPA accused the DOE and the Rockwell Corporation (the then-current management) of breaking safety-related laws at the plant and deliberately falsifying documents related to waste disposal and similar matters. Specifically, the DOE and Rockwell illegally dumped experimental medical wastes and chemicals into streams that entered the local drinking water supply. They made low estimates of waste as well as inaccurate declarations about waste disposal at the plant. Also, they reclassified several hazardous wastes to "nonhazardous," and falsified federal environmental reports. Concomitant with these charges, the Colorado Department of Health cited the facility for 25 violations of that state's hazardous waste regulations. (Lodwick, 1993). These revelations sparked community outrage; local political leaders, citizens, and workers felt deceived and betrayed. One Colorado State Representative articulated these sentiments:

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[3] Hardert (1993) traces similar developments at the Fernald weapons plant.

[4] Dow Chemical Company, Rockwell International, and E.G. and G., Inc. have all managed the facility. Several government entities have been involved in this history: namely, the Atomic Energy Commission, the Energy Research and Development Administrations, the Department of Energy, state and local leaders, Congressional Representatives and Senators, congressional committees, state and county health departments, the Environmental Protection Agency, and the Federal Bureau of Investigation.

> It's clear we've been lied to year after year . there is clear collusion between Department of Energy officials and Rocky Flats officials . . . plant officials who are criminally involved must be removed immediately. DOE and Rockwell have done little to deserve the public's trust and confidence. Credibility here is a critical value. . DOE is very short on it these days. They can't afford to squander what they have. ( [unnamed Representative in Lodwick], *Rocky Mountain News*, June 7, 1989 cited in Lodwick, 1993)

Revelations that the DOE and Rockwell deliberately lied to the public and local officials proved conspicuous recreancy and elicited emotional expressions of public distrust.

Even those who depended on Rocky Flats for their livelihood and had previously trusted its management began expressing deep concern about the plant's operation. In 1990, a local citizen group called "Neighbors Concerned About Rocky Flats" interviewed 229 residents of a blue-collar community near the plant to determine their perceptions of Rocky Flats. The majority of these residents had lived near Rocky Flats for 20 or more years and either worked at the plant or had friends, family members, or neighbors working at the facility. In the sample, over 75 percent of those interviewed stressed Rocky Flats' contribution of jobs and other economic benefits to the surrounding region. However, despite their high level of economic dependence on the plant, 53% of the respondents expressed a negative opinion of Rocky Flats 87% of respondents voiced strong concern about such specific local issues as air, soil, and water contamination (survey cited in Lodwick, 1993).

Other studies document similar concerns at other DOE sites across the country (e g., Hardert, 1993). Many individuals living near Rocky Flats maintain that they have cancer because of exposure to radiation from Rocky Flats. Rocky Flats is not peculiar in this regard: the management at Hanford in the 1940s and 1950s deliberately released radioactive iodine 131 " to see if . . .[the management] could reduce the amount of time

uranium must be cooled before being processed into plutonium, presumably to increase production " (Magnuson cited in Hardert, 1993, 136). People who had been exposed were not informed about the releases until quite recently Those living near the Hanford site call marks from thyroid operations "downwinder" scars because they maintain that radioactive-iodine releases from the facility led to thyroid cancer (Cramer et al., 1988).

Why the Cloak of Secrecy Lifted

The end of the Cold War, a changed regulatory environment, increased national attention on mismanagement at the sites, the intensification of problems at aging facilities, the potential cost of a cleanup, and the deep public distrust of sites such as Rocky Flats altered the mission of the DOE. By 1991, the DOE no longer had a reason nor the ability to maintain their earlier tight-lipped secrecy. Although some secrecy was still crucial in managing nuclear weapons stockpiles, it was no longer necessary to withhold information relating to the health and safety of citizens and the environment. Secretary of Energy Hazel O'Leary promised that "the Department of Energy is removing the cloak of Cold War secrecy that has shrouded its nuclear weapons program for 50 years. . . . The Cold War is over, and we're coming clean" (U.S. Department of Energy, 1995, 83). Congress mandated that, as of 1992,[5] the DOE should be subject to the same environmental laws as civilian industries (e.g., the Clean Water Act)

Increased National Attention: The Role of the Media

National attention to site problems profoundly effected DOE actions. Although such local papers as *The Rocky Mountain News* (Colorado) and *The Columbia State and*

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[5] In 1992, Congress passed the Federal Facilities Compliance Act (FFCA) requiring federal facilities to comply with civilian laws regarding environmental protection.

*Record* (South Carolina) had reported on health, safety, and environmental effects of the complex for decades not until 1988 did the national media scrutinize the nuclear weapons complex. Congressional hearings about restarting operations at the Savannah River Site (SRS)--the only site that produced tritium--after an operating accident in 1988 sparked national interest.[6] During those hearings, Rep. Mike Synar (D-Oklahoma) and Sen. John Glenn (D-Ohio) released a 1985 memorandum from an engineer employed by E.I du Pont de Nemours and Co (the contractor operating the SRS since its opening in 1952). The memo documented 30 serious accidents at the SRS: some approached the gravity of the near catastrophic partial meltdown of a commercial reactor at Three Mile Island near Harrisburg, Pennsylvania in March 1979. The accidents at SRS included the melting of radioactive fuel as well as significant releases of radioactivity into the atmosphere and ground water The local press described many of these accidents; however, military secrecy and employee loyalty at the SRS had kept details from the press and general public.

Neither reporters nor congressional aides revealed the most damning information about the damage wrought at the SRS nuclear weapons facilities. The DOE itself broke its habitual silence about risks posed by the sites and voluntarily released the DuPont memo along with information about the high costs of maintaining the weapons arsenal. Whereas national security had provided a cloak of secrecy for the agency in the past, the

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[6] Tritium is a radioactive, gaseous form of heavy hydrogen that is used to increase the explosive force of H-bombs Plutonium, the central ingredient in nuclear weapons, is a heavy metal. By using tritium, warheads can be made lighter and more powerful. Approximately 90% of the warheads in the United States arsenal contain tritium. Tritium's radioactivity decays at a rate of 5.5 percent a year (unlike plutonium which decays much more slowly); therefore, new tritium must be periodically added to the warheads to keep them operational (Lanouette, 1990).

anticipated cost overhauling the system and cleaning up the environment around sites led the DOE to disclose the state of its facilities and the extent of the damage it caused. These disclosures were " a calculated risk: . . [the DOE] . . admit[ted] serious failures and longstanding problems in order to make the case for surprising budget increases" (Lanouette, 1990, 12-13).

As a result of this information release and the attendant media response, the nuclear weapons complex gained national recognizability. The October 1988 cover of *Time* magazine pictured a couple with their two sons, one of whom was missing a leg; the caption read "They Lied to Us." The article's full title. "They Lied to Us: Unsafe, Aging U.S. Weapons Plants Are Stirring Fear and Disillusionment" points to its substantive depiction of "Government complacency, recklessness, and secrecy" surrounding the network of Department of Energy (DOE) nuclear weapons facilities across the United States (Cramer et al., 1988, 61). The risks posed by these nuclear weapons facilities and the widespread distrust in those communicating information about these risks are significant, not only to *Time*'s cover family, but also to countless other individuals who may have been exposed to hazards from any one of the 132 DOE facilities

Changes in the Regulatory Environment

Self regulation had freed the DOE from the environmental restraints imposed on civilian industrial and manufacturing operations. Beginning in the 1970s, civilian industry was subject to increasing regulation in addition to federal clean air and water standards. Despite the passage of Federal right-to-know laws in the 1980s, the DOE vigorously resisted efforts by other federal agencies and state governments to exercise environmental oversight. Until the mid-1980s, the DOE claimed that, because it was under the

jurisdiction of the Atomic Energy Act and its amendments, it was exempt from all civilian laws. The problems resulting from nuclear wastes at the DOE sites are generally more substantial than those resulting from civilian industries. The nuclear weapons complex contaminated unprecedented amounts of soil and water (Makhijani, 1995). Moreover, the DOE's stress on public relations rather than public education about the risks stemming from the nuclear weapons complex ensured that precautions which might have helped affected individuals to protect themselves were not taken (Makhijani, 1995). After 1992, when Congress passed the Federal Facilities Compliance Act (FFCA) requiring federal facilities to comply with all laws regarding environmental protection, the DOE began taking substantive steps to address the waste problem for which it was responsible.[7]

## The DOE's New Mission: The "Openness Initiative"

In the late 1980s, concerns about the environmental as well as safety considerations had led to temporary shut downs of several parts of the nuclear weapons complex. However, the dissolution of the Soviet Union in 1991 precipitated the United States' permanent shutdown of various components of the complex; with the end of the Cold War, the mission of the Department of Energy changed from producing weapons to cleaning up the environment.

This new mission has four major components: managing urgent and high-risk nuclear weapons and facilities, managing a large amount and wide variety of wastes,

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[7] Several laws pertain to the nuclear weapons complex: the Clean Air Act, the Clean Water Act, Resource Conservation and Recovery Act, Toxic Substances Control Act, Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA or Superfund), Superfund Amendments and Reauthorization Act, Emergency Planning and Community Right-to-Know Act (SARA Title III), Safe Drinking Water Act, and the Freedom of Information Act (Shulman, 1992).

environmental restoration, and technology development (U.S. Department of Energy, 1995, 6-8). The management of high-risk nuclear weapons and their facilities remains the DOE's first priority; it is difficult because many of the sites are over 40 years old and deteriorating. Stabilizing the wastes from the sites is crucial to protecting workers and the public at large. Although the bulk of the wastes stem from nuclear weapons activities during the Cold War, the DOE also has responsibility for wastes from some nuclear research and commercial nuclear power activities. Managing these wastes requires the development and operation of treatment facilities to prepare the wastes for disposal as well as efforts to determine where these wastes may be stored.

"Environmental restoration"--or cleanup--at DOE facilities involves a variety of activities from stabilizing contaminated soil to pumping, treating, and containing ground water. In several cases, technologies appropriate to the contamination problems do not exist. The DOE now seeks the input of state and local governments, environmental regulatory agencies, and the general public to pinpoint cleanup procedures that will "avoid additional problems, minimize hazards to workers and the public, and minimize the costs and risk passed on to future generations" (U.S. Department of Energy, 1995, 7). In the past, the DOE--by its own admission-- "decided, announced, and then defended policy." The DOE's new "openness initiative" means that it now attempts to "engage the public, debate, decide, announce then go forward" (Secretary of Energy Hazel R. O'Leary cited in U.S. Department of Energy, 1995, 83).[8] Finally, the DOE is developing safe and effective technologies to ameliorate and resolve contamination problems for which

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[8] The CERE study--the source of data for the present research project--reflects this initiative.

solutions do not presently exist. This activity is crucial to the long-term successful management of the Cold War's environmental legacy (U.S. Department of Energy, 1995, 6-8).[9]

Changing the DOE's mission resulted in the release of declassified information that has affected the political climate at major facilities. Since 1993, the DOE had been revealing information on its inventory of plutonium and secret nuclear tests. The department encouraged "whistleblowers" to report mismanagement as well as noncompliance with regulations. At present, the DOE solicits citizen involvement to help set priorities for cleanup and a course of action to deal with the uncertainties of the site damage. These initiatives, although a step toward a better relationship with the public, may not be sufficient to restore public faith in the agency. There is hope, however. Living near the Fernald site, Lisa Crawford--co-founder of Fernald Residents for Environmental Safety and Health (FRESH)--contends: "Once trust is taken away, it's very hard to get it back. [The] DOE must continue to work cooperatively with the community and clean up the Fernald site. Then, and only then, will the possibility of trust be restored" (U.S. Department of Energy, 1995, 72).

## The Scope of the Problem: Damage and Cleanup Cost

Reports in the mainstream media now illuminate the scope of the environmental damage at the sites. The 200 billion gallons of low-level nuclear waste dumped into ponds and other basins at all DOE sites could fill a 40 foot deep lake covering an area the size of Manhattan. At present, the United States has 20 million cubic meters of nuclear

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[9] As of 1993, new nuclear weapons are not produced in the United States; however, designing weapons continues (Makhijani et al., 1995)

waste requiring disposal. Reports of radioactive wildlife are common at all of the sites. Scientists have found radioactive geese, ducks, fish, and turtles at Oak Ridge, Tennessee (Holloway, 1990). They also found contaminated deer. Radiation is such a part of people's daily lives at Oak Ridge that when an area hunter kills a deer, he or she will "routinely run parts of it by a wildlife agent for radiation tests before serving it for dinner" (Cramer et al., 1988, 65). *The Columbia State and Record* reported on a four legged owl and its deformed young found on the grounds of the Savannah River Site. Generally, scientific experts and the DOE consider the environmental damage at these sites--though still undergoing assessment--to be vast and significant.[10]

The DOE's most recent *conservative* total cost estimate for cleanup of its hundreds of facilities located on all DOE sites is $227 billion over 75 years (U.S. Department of Energy, 1996). Not surprisingly, the estimated costs rise with the passage of time. In 1988, the DOE estimated that $100 billion would be needed to cleanup the sites. Recent external estimates indicate that up to $1 trillion dollars will be necessary to cleanup the DOE facilities (Veiluva, 1996).

The nature of the cleanup has yet to be determined: the DOE has considered several land-use options and different levels of cleanup. Hypothetical scenarios under discussion for the five highest-cost sites range from an "iron fence" to "maximum feasible greenfields." [11] At the lowest level of cleanup, the "iron fence scenario" will cost about $150 billion over the next 75 years. The "iron fence" simply seals off contaminated sites

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[10] See Makhijani et al., 1995, 216-253, for a detailed description of the damage at several of the sites.

[11] These five sites comprise approximately 70 percent of the total cost estimates.

without removing the toxic wastes. The highest level of cleanup--the "maximum feasible greenfields" scenario--would cost some $284 billion over the next 75 years, but would return the sites to agricultural or residential use (U.S. Department of Energy, 1996). Significantly, much of the technology needed to accomplish this latter goal has yet to be developed (Stadie, 1996). Thus, the cost estimate of returning the sites to agricultural or residential use is quite fragile in the absence of necessary technology.

## Risk, Resource Scarcity, and Cleanup Priorities

The cleanup of nuclear weapons facilities raises several complex issues that illustrate the uncertainty of environmental risk assessment. First, how much radiation is too much? Radiation exists in nature, making it sometimes difficult to determine what man-made sources needs to be cleaned up. Substantial hazards obviously need to be redressed, but debate ranges over how much man-made radiation constitutes a danger to human well-being. Second, some of the cleanup at the DOE sites requires technologies that have not yet been invented Should the DOE wait for newer and better technologies or should it do what can be done with existing technology? Third, and central to this research, there is much uncertainty over risk assessment. Because of imprecise data, determining the significance of various risks posed by the sites is problematic. Consequently, it is hard to determine when and what actions should be taken on the basis of scientific data or expert opinions alone. Finally, the DOE must weigh any assessment of the benefits of a cleanup--including the reduction of risks to the public--against its financial cost (U.S. Department of Energy, 1995, 70).[12]

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[12] The DOE contracted with CERE (the source of data for the present research project) to aid it in gaining public input, including the views of affected citizens, on these issues

Public Perception of Risk: Is There Only One?

The DOE has committed itself to consulting citizens about their opinions and preferences towards managing the risks at the major sites. In making sense of the world, all individuals rely on their own cognitive maps. These maps locate risk perceptions, or "intuitive risk judgments," thereby allowing individuals to assess the risks that they encounter. Few people apply sophisticated technological or scientific analyses to the risks that they face (Slovic, 1987, 280). A major component of risk perception is an individual's *level of concern* about risk. Why is concern about environmental risk so important? Politically, policymakers must understand citizens' concerns about environmental risk to effectively communicate the threats attendant on specific hazards, to forge policy responsive to public concerns, and to gain credibility in the process.

Many studies document differences among citizens' levels of concern relating to environmental risks (e.g., Flynn et al., 1994). Several studies find that experts and the laypublic (those not engaged in scientific careers) perceive such risks differently (Fischhoff et al., 1983; Flynn et al., 1993). Other studies document differences between groups (e.g., Flynn et al., 1994): women, for example, tend to be more concerned with environmental risk than are men (Greenberg and Schneider, 1995; Davidson and Freudenberg, 1996). In the socially heterogeneous United States, it is logical that risks would be perceived differently by different segments of the population. A wide variety of cultural groups--including those distinguished by gender, age, ethnicity and race--define such segments. How do such culturally significant variables as ethnicity and race affect people's concerns about environmental risk? How may they effect the DOE's cleanup? These questions lie at the heart of this project

## Considering Race and Ethnicity

Culture may be conceptualized by looking at shared group experiences. An individual's ethnicity and race may provide a basis for that individual's concerns about environmental risk as well as his or her selection of who to trust for information on the risks to which he or she is exposed. Though tentative, fragmentary evidence suggests that public concern about environmental risk relates to ethnicity and race and has led some scholars to call for a more detailed exploration of the importance of these variables (Vaughan and Nordenstam, 1991; Vaughan, 1995a, Vaughan, 1995b). This research project aims to document differences in the concern of distinct ethnic and racial groups as these concerns pertain to the environmental risks to which such groups are exposed, and reflect on trust in government and other social institutions.

## The CERE Study

Instructed by Congress to produce a report about the health and safety risks posed by its sites, the DOE, an agency burdened with the stigma of its long history of institutional secrecy and deception, chose to contract with the Consortium for Environmental Risk Evaluation (CERE) to study the six most environmentally degraded sites.[13] The sites appearing to pose the greatest threat to public health and safety were: Hanford Site (Richland, Washington), Savannah River Site (Aiken, South Carolina), Oak Ridge Reservation (Oak Ridge, Tennessee), Rocky Flats Environmental Technology Site (Golden, Colorado), and Fernald Environmental Management Program (Fernald, Ohio). Figure 1-1 locates these sites.

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[13] This is one of many DOE-contracted and other studies related to this problem.

The CERE study had two components: it provided an expert assessment of risks as well as a report on public concerns about those risks. Documenting public concerns was central to the project because, "in many cases, the most vexing problems cannot be addressed solely by science but will require a broad-base and informed public debate" (U.S. Department of Energy, 1995, 86). The study's public concern component provided a wealth of data with the potential to illuminate differences among groups in their level of concern about environmental risk.

In keeping with the DOE's new mission, CERE went beyond the conventional public hearing format and characterized public concerns from local communities aroundthe nuclear weapons facilities. At all the sites selected for study, CERE conducted focus groups. CERE did something else unconventional: it targeted traditionally underrepresented groups including minorities and lower income individuals who have historically had limited, if any voice, in the political process. Almost one-third of the total number of focus groups contained individuals drawn exclusively from members of traditionally underrepresented groups and those "disproportionately effected" by the DOE site. These groups were African-Americans, Asian-Americans, Latinos, Native Americans, downwind whites, and downgradient whites.[14] Focus group data offer a unique opportunity to assess whether different ethnic and racial groups vary in their level of concern about the environmental risks to which they are exposed and how they view

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[14] The downwind populations include "those individuals who live in areas determined to be downwind from the installation based on airborne emission studies;" downgradient individuals make up the "population . . in the direction of groundwater flow away from the installation" (CERE, 1995)

Figure 1-1. DOE Weapons Complex Installations Included in CERE Study.

the communicators of those risks [15] These data permit an exploration of these topics leading to new interpretations for the results.[16]

## Why Focus Groups?

Although Chapter 3 assesses focus group methodologies, it is useful here to observe that they provide an useful alternative to survey research approaches for several important reasons. Surveys, often used to examine attitudes toward the environment, seldom measure in any depth or detail the contextual and situational nature of such attitudes; they seldom address how and why individuals view the environment as they do. Survey research does not usually provide much insight about the cognitive processes associated with citizens' thinking about environmental issues or citizens' concerns about risk priorities. Because of these limitations surrounding the interpretation of survey research results, focus groups were appropriate for gaining a better and more detailed understanding of the wishes of citizens.

## Dissertation Outline: Ethnic and Racial Differences in Environmental Risk Perception and Repositories of Trust about Risk Management

Chapter 2 examines the reasons why different ethnic and racial groups might hold varying perceptions of risk: it reviews the evidence showing that minorities have disproportionately high levels of exposure to environmental hazards. Perceptions of risk, however, are distinct from objective levels of risk, and must be explained with reference to

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[15] As with most studies that use national surveys, the author had no control over the focus groups. Thus, the data analyzed here--not conducted by the author--was collected for purposes other than the author's. The author necessarily remains dependent on the material and the format in which it was collected.

[16] The data cannot sustain statistical generalizations across populations.

psychological, social and cultural variables. This study adopts the comparatively under-used social and cultural approach to risk perception. The existing literature suggests that ethnic and racial minorities perceive risks in ways quite distinct from whites, but it has serious limitations. Most studies fail to disaggregate the "nonwhite" population into sociologically meaningful groups. Moreover, there is no standardization in the measurement of concern about environmental risk across studies. The focus group data analyzed here permits empirical examination of the question of inter-group conceptual homogeneity with respect to "environmental risks." This research predicts that differences with respect to the institutions that individuals look to for credible risk communication will parallel difference among groups' perceptions of risk.

Chapter 3 discusses the dissertation's research design. This chapter describes the CERE data and discusses the strengths of focus group data for research on questions for which there is an absence of strong pre-existing theory. Focus group data provide qualitatively superior measurement and mitigate against *a priori* restrictions on the sorts of information collected. The researcher applies content analysis to the data to discern variation in concern about environmental risk and institutional repositories of trust. An ordered probit analyzes the survey component of the CERE study and establishes ethnicity and race to be important in the determination of an individual's level of concern over environmental issues.

Chapter 4 documents that, among distinct ethnic and racial groups, there do appear to be substantial differences in levels of concern about environmental risk. It suggests that there is no homogeneity among "nonwhites" in the study with respect their risk perception. Also, it documents substantial differences across racial and ethnic groups

in the level of general environmental concern that they exhibit, even when background income and demographic controls are introduced. In this chapter, the researcher hypotheses that variations in concern about environmental risk relate to the institutions which individuals trust or distrust to communicate truthful risk information

Chapter 5 argues that public trust is crucial for effective risk communication to citizens as well as to policy-making. To effectively communicate risk, decision-makers must comprehend the effect and effectiveness of their messages on those receiving them. This chapter briefly reviews the existing literature on inter-group differences in trust in government and other social institutions. The data analyzed in this research reveals substantial differences in individuals' institutional trust repositories. This chapter argues that a strong relationship between risk perception and institutional repositories of trust exists.

Chapter 6 examines the relationship between concern about environmental risk and trust in risk communicators. From the data here, concern about environmental risk tends to be affected by who groups trust for information about these risks. This chapter develops the thesis that group heritage and background is central in explaining group-based trust and has a profound impact on concerns about environmental risk.

The concluding chapter summarizes the previous chapters and uses their findings and assertions to explore data from the Native American focus groups and to provide specific policy recommendations for all ethnic and racial groups in the study. For example, it proposes that policymakers need to be made aware of the strength of African-American's concern about environmental risk as well as this group's lack of trust in government. To have effective risk communication, policymakers must coordinate their

efforts with citizen groups, and be sensitive to the distrust African-American individuals feel.

## The Policy Importance of this Study: Working Toward More Legitimate and Effective Government

Citizens no longer implicitly nor generously trust important social institutions. This renders government decision making more difficult and threatens the legitimacy of its policy processes. For a society to function smoothly, government must restore the confidence of the citizens it governs. Most individuals associate their distrust with Congress and the poor image of many politicians. However, distrust has important implications for policymakers and agencies, such as the Department of Energy (DOE), which daily communicate environmental risks effecting the public. The citizens exposed to environmental risks from DOE sites need to be informed--accurately and fully--about these risks, and the agency realizes that it must restore its own credibility before the public before this can occur.

Implicit in our notions of legitimate government are ideas of representation. Citizens should be able to trust the government to act in their interest and government should provide citizens with opportunities to participate meaningfully and equally its processes. In terms of the DOE sites, ideally all affected citizens should be allowed to participate in the processes of the cleanup. This applies to everyone, especially those people who have historically been "outside the process" such as minorities and lower income individuals.

This study can make a significant contribution to the development of mechanisms for strengthening legitimate government by exploring and documenting differences among

ethnic and racial groups in the following chapters. Given the existence of differences in concern about environmental risk and the institutions in which different groups invest trust, effective communication between public authorities and citizens requires attention to the appropriate *intermediary* in risk communication. Further, to the extent to which public agencies recognize differences among ethnic and racial groups and improve citizen access and involvement, this recognition and these actions should enhance government legitimacy and effectiveness.

# CHAPTER 2
# EXISTING THEORY AND FRAMING THE PROBLEM

Substantial evidence indicates that racial and ethnic minorities in the United States are consistently exposed to more environmental hazards than the bulk of the population. Theories of risk perception, generally, imply variation in risk perceptions among citizens in the socially heterogeneous United States. However, relatively few empirical studies of the risk perceptions of minority groups clarify differences among them in how they perceive the environmental risks to which they are exposed. The recognition of differences in concern about environmental risk among minority populations has significant implications for policymaking because these perceptions have political consequences. As mentioned in the preceding chapter, the Environmental Justice Movement (EJM) organized because ethnic and racial minorities view their exposure to environmental risk as being different from that of the majority of the population.

As a consequence of such developments, government policymakers must be sensitive to the views of different audiences. In risk communication, declining trust is "the single most important problem undermining government risk communication efforts" (Covello et al., 1989). Recent studies indicate a general decline of public trust in government and other social institutions. Reestablishing trust through risk communication requires a precise understanding of the views of stakeholders. This is especially true for minorities who, because of greater levels of exposure to environmental risks and concerns

about environmental racism, have more reason for losing trust in government sources of risk information. Determining whom these groups do trust to provide them with reliable information about environmental hazards is crucial in establishing responsible and effective risk communication. This study analyzes the relationship among ethnicity, race, concern about environmental risk, and group trust. It posits a relationship between risk concern and institutional trust; specifically, that different ethnic and racial groups vary systematically in their concern about environmental risk and their institutional repositories of trust. These differences require significant attention from risk communicators.

Minority Populations Have Higher Levels of Exposure to Environmental Hazards

All individuals are potentially exposed to a large number of environmental hazards Hazards surround us all.[1] Potential environmental threats, such as toxic waste, air pollution, groundwater contamination, and industrial accidents, concern most individuals. Although these hazards potentially effect many citizens, racial and ethnic minorities appear to be consistently exposed to greater levels of environmental pollution and degradation than whites. This evidence is not conclusive; however, nonwhite groups increasingly *believe* that they are disproportionately exposed to these hazards, and act politically on that belief as the existence of the EJM testifies.

Studies indicate that racial and ethnic minority groups *are* exposed to more environmental hazards than other groups.[2] Some scholars debate whether this higher

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[1] Even though the public is exposed to myriad hazards, the average person tends to live longer and enjoy better health than previous generations (Wildavsky, 1979). Regardless of this trend, the media, and consequently the public, place more attention on risks than in the past.

[2] Many of these studies are discussed later in the chapter (e.g., United Church of Christ, 1987).

exposure is related to race and ethnicity or to income (Been, 1994).[3] In either case, it seems certain that racial and ethnic minorities are exposed in above-average numbers to environmental pollutants. Because past experiences affect risk, those consistently exposed to more environmental hazards ought to have different levels of concern about those risks (Fitchen et al., 1987). The following sections review the major empirical findings about minority exposure to residential, occupational, and dietary environmental hazards.

Residential Exposure

Residents of inner urban areas are exposed to higher than acceptable levels of hazardous environmental pollutants because these areas tend to have "dirtier air and drinking water, more wastewater and solid-waste problems, and greater exposure to lead and other heavy metals than nonurban areas" (Kazis and Grossman cited in Bullard, 1993). Minority populations are concentrated in urban areas. In general, the distribution of racial and ethnic groups results in disparate exposures to environmental hazards. However, minorities in rural areas may also be exposed to more hazards than their white counterparts. Since clear evidence exists about the character of the hazards to which minorities are routinely exposed in urban areas, the following discussion on residential exposure draws from three main areas: lead, air pollution, and hazardous waste sites.

Lead levels in blood

Industrial societies expose their citizens to lead in significant quantities. Lead is widely used in such products as gasoline and paint and it can contaminate air, water, and soil. By one estimate, present exposure to lead is, on average, 1,000 times greater than in

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[3] This debate involves environmental justice. Environmental justice is discussed later in this chapter

prehistoric times (Schwartz and Levin, 1992). Awareness of lead's ubiquity and harmful effects led to changes in national air quality regulations. In the past twenty years, tighter restrictions on leaded gasoline decreased the blood lead levels in the overall population. However, this improvement is not demographically uniform. Minority populations are still disproportionately exposed to this harmful pollutant.

The most significant source of exposure continuing to effect minorities more than other populations is lead paint. The paint on older houses (especially housing built before 1950) tends to have relatively high concentrations of lead. Further, the condition of this paint is important; dwellings with deteriorating paint pose a greater threat to their inhabitants than do pristine buildings.[4] Most lead exposure originates from lead-contaminated dust in houses or apartments.

Other sources of lead exposure are relevant to minorities. Minority populations tend to live in older urban areas where soils have been contaminated by leaded gasoline. This problem can be mitigated by barriers, such as lawn furniture or patios, that shield individuals from this contamination. However, minorities in these areas tend to lack such barriers. Nor do household risks end with paint and contaminated soil. Traditional foods, medicines, cosmetics, and even cooking vessels used by minorities can increase exposure to lead. Certain occupations pose a greater risk of exposure than others: construction and automobile repair are particularly dangerous and employ large numbers of minority workers (Freudenberg, 1984).

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[4] Seventy-five percent of the housing built before 1940 has concentrations of paint lead higher $2mg/cm^2$ (this is twice the level defining lead paint). In housing built between 1960 and 1979, only 18 percent of the houses have similarly high levels of lead in their paint. Generally, housing built after 1980 does not contain lead paint (Schwartz and Levin, 1992).

Although lead exposure is widespread, the cumulative effects of this exposure are greatest on children. Children can suffer brain damage resulting in learning impairment, behavioral changes, and even death Children are particularly susceptible to paint exposure because their hand-to-mouth activity leads to direct ingestion of lead-contaminated dust and paint chips. Children can also be exposed to lead through soil in their backyards and the canned foods they eat. Contact with family members, who are exposed to lead in their occupations, can elevate lead blood levels in children (Schwartz and Levin, 1992). Although all racial, ethnic, and socioeconomic groups have some children with unacceptably high levels of lead in their blood, African-American children have higher percentages of lead in their blood than white children regardless of income level.[5]

Air pollution

Outdoor air quality, another component of residential exposure to pollutants, has been the subject of much debate over the last thirty years. Ethnic and racial minorities concentrate in urban areas where air pollution can be up to five times greater than in suburban areas (Bullard, 1990). Although living in urban areas increases exposure to air

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[5] The Second National Health and Nutrition Examination Survey (1976-1980) determined that the average blood level for children under the age of 6 was 16 micrograms of lead per deciliter of blood 9 (ug/dl) while for African-American children this same measure was 21 ug/dl. For children in the lowest quintile of family income, this figure was 20 ug/dl The blood levels for children in the inner city were greater· lower income African-Americans living in the inner city had average blood levels of 23 ug/dl. In the 1980s, the Centers for Disease Control (CDC) recommended that children with a blood lead level of 25 ug/dl or more should be tested to determine if hospitalization was needed (Schwartz and Levin, 1992) In October 1991, the CDC lowered this acceptable blood level to 10 ug/dl (Phoenix, 1993). Since the greater restrictions on leaded gasoline, the present average blood level for children is estimated at 6ug/dl, but some scholars hypothesize that there is still great, if not greater, disparity of these blood levels by race and income (Schwartz and Levin, 1992). One account reports that the average blood lead level of African-American children is above 6 ug/dl, and many of these children have above 10 ug/dl of lead in their blood (Phoenix, 1993).

pollution, there is more to the story than simply an urban versus rural distinction. Other factors, such as the location of air-polluting facilities in both urban and rural areas, are also significant determinants of air pollution exposure. One analyst found that between 1970 and 1984 minorities were exposed to significantly more air pollution than were whites throughout the United States as a whole (Gelobter cited in Bryant and Mohai, 1992).

Overall, aggregate data suggest that African-Americans and Latinos are exposed to elevated levels of air pollution. The Clean Air Act (1990) mandated that the Environmental Protection Agency (EPA) establish national ambient air quality standards for several pollutants including carbon monoxide and ground-level ozone. A recent article outlining the impact of these pollutants on racial and ethnic populations presents a great deal of evidence to show that, of those groups examined (African-Americans, Latinos, and whites), a higher percentage of African-Americans and Latinos live in areas with reduced air quality than is true of the white population (Wernette and Nieves, 1992). The distribution of ground-level ozone exemplifies this trend: 52 percent of whites live in counties with high levels of ozone as opposed to 62 percent for African-Americans and 71 percent for Latinos (Wernette and Nieves, 1992, 16). Similarly, carbon monoxide exposure also varies with ethnicity and race. In the Northeast census region, 85 percent of African-Americans and 88 percent of Latinos live in areas with excess of levels of carbon monoxide as opposed to 50 % of whites (Wernette and Nieves, 1992, 16).

In 1990, of the over 3000 counties and independent cities in the United States, 437 did not meet one or more of the EPA's ambient air quality standards. A disproportionate number of minority and poor people lived in these substandard areas (Wernette and Nieves, 1992). Moreover, the percentage of poor people in cities or counties with

substandard air quality standards fell below that of the racial and ethnic minority populations Income does not completely explain the concentrations of minority populations in poor air-quality areas (Wernette and Nieves, 1992).[6]

The main sources of air pollutants are unevenly distributed over the United States. The majority of air-polluting facilities are concentrated in the South, a region with a high percentage of African-Americans relative to the rest of the country.[7] Furthermore, 63 percent of these facilities are in urban counties of which twelve percent have greater than 31 percent of minorities. These counties with a third or more minority population contain 21 percent of all air-polluting facilities in the South. Therefore, air-polluting facilities are concentrated in counties with high percentages of minorities (Wernette and Nieves, 1992, 17). In sum, minority populations are exposed to higher levels of air pollution than the general population.

Hazardous waste facilities

The Environmental Protection Agency (EPA) estimates that between 20 and 40 million citizens live within four miles of the nation's worst hazardous waste sites (Breslin, 1993, 484). These sites are listed on the National Priority List (NPL). On the NPL, the EPA designates the worst sites for cleanup under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), also known as "Superfund." While this may look like a good start, as many as 36,000 other sites, not listed on the NPL, may be harmful to citizens (Breslin, 1993, 484). Studies of the distribution of NPL

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[6] See Wernette and Nieves for the percentage of population groups living where air quality standards are not met (1992, 17).

[7] Approximately half of the almost 3000 major air-polluting facilities are located in the South. The region with the penultimate number of these facilities is the North Central region, followed by the West and Northeast regions (Wernette and Nieves, 1992)

and other hazardous waste sites reach varied conclusions as to whether minorities are disproportionately exposed to hazardous waste facilities [General Accounting Office (GAO), 1995]. A few studies find no significant relationship between the location of hazardous waste sites and minority populations (e.g., Claritas, Inc. for Waste Management, Inc., 1992; Zimmerman, for EPA's Region II, 1994 both cited in GAO, 1995).[8] Other studies are inconclusive (e g., Zimmerman, 1993; ICF Inc., and ViGYAN, Inc., for EPA, 1994 both cited in GAO, 1995).[9]

The debate continues, but most studies reveal a disproportionately high degree of minority population exposure to hazardous waste facilities. A 1983 General Accounting Office (GAO) report on hazardous landfills in the southeast found that three of every four off-site landfills, designated by states for disposal of hazardous wastes, were sited in predominately African-American or low-income communities.[10] In the areas studied, African-Americans comprised approximately 20% of the population, but 75% of the landfills were located in African-American communities. In all four of these southeast communities, at least 26% of the population had incomes below the poverty level. One site assessed by the GAO in Sumter County, Alabama, is the largest landfill in the nation. Almost 70% of the residents of Sumter County are black and 96% live below the poverty line (GAO Report, 1983). Later studies confirm the GAO report: in 1992, African-Americans still made up approximately one-fifth of the population, but the southeast

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[8] Many of these studies tend to be industry sponsored.

[9] See Appendix A for a summary of these and other demographic studies.

[10] The report looked at the Environmental Protection Agency's Region 4 comprising: Alabama, Florida, Georgia, Kentucky, Mississippi, North Carolina, South Carolina, and Tennessee.

region's only two operating off-site commercial hazardous waste landfills were situated in areas where African-Americans formed a majority of the population (Bullard, 1992, 12).

In 1987, the United Church of Christ (UCC) Commission for Racial Justice studied the racial and socioeconomic makeup of citizens residing in areas around uncontrolled hazardous waste sites (unregulated dumps and abandoned production operations) as well as commercial hazardous waste sites. The Commission's report maintains that race or ethnicity, not income, is the most significant variable in siting hazardous waste facilities nation-wide.

The UCC report confirms the ongoing relationship between minority status and elevated minority exposure to environmental contaminants. According to the study, three of every five African-Americans reside in communities with abandoned toxic waste sites. Fifteen million African-Americans and eight million Latinos live in communities with uncontrolled toxic waste sites. Two million Asian and Pacific Islanders and 700,000 Native Americans reside in communities with similar sites (Mushak, 1993, 478). Three of the five largest commercial landfills are located in predominately African-American or Latino communities. In 1986, these five landfills accounted for 40 percent of the country's total estimated landfill capacity. Cities with the most abandoned toxic waste sites--Atlanta, Chicago, and St Louis--have populations with high concentrations of African-Americans (Bullard, 1992). A 1994 report, conducted by the Center for Policy Alternatives, updated the UCC study and reaffirms that minority populations are far more likely to live near hazardous waste facilities than are their white counterparts (cited in GAO, 1995).

Other national and state level studies find strong evidence of unequal minority exposure to hazardous waste sites. A Greenpeace-sponsored report specifically looks at hazardous waste incinerators: *Playing with Fire* (1990) demonstrates that communities with such incinerators have populations with 89 percent more minorities than the national average (cited in Bullard, 1992, 12). Several of these studies focus on superfund sites (or those sites listed on the NPL). On the national level, John Hird's 1993 study of 814 superfund sites indicates that a disproportionately high number of racial minorities reside in counties containing these sites (cited in GAO, 1995).[11] Information provided by the EPA's Toxic Release Inventory (TRI) on potential sources of hazardous materials is useful in studying minority exposure to toxic waste. At the state level, Philip H. Pollock, III and M. Elliot Vittas (1995) use TRI data to correlate industrial toxic releases and potential pollution exposure with Florida's demographic characteristics. They conclude that Florida's racial and ethnic minorities, and especially African-Americans, live closer to sources of potential toxic exposure than do white Floridians.

Occupational Exposure

Consistently high levels of minority exposure to environmental hazards also characterize certain occupations--particularly, migrant farm work, uranium mining, and industrial work. These occupations have greater than average proportions of racial and ethnic minority workers.

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[11] This study did not include ethnicity; Latinos were not delineated. This study is cited in GAO, 1995.

Migrant farm workers

According to Ivette Perfecto (Perfecto, 1992) documenting the link between pesticides and farm worker health is difficult because most problems go untreated and, if treated, underreported. Public concern over the dangers posed by pesticides to habitat and wildlife, generated, in part, by Rachel Carson's *Silent Spring* (1962), broadened in recent years and now incorporates an awareness of pesticides' impact on migrant farm workers.[12] Exacerbating the problems facing these workers, such federal laws as the Occupational Safety and Health Act (OSHA) exclude migrant farm workers.

In the United States, agriculture is the largest single user of pesticides (80 percent of total use). More than one billion pounds of fungicides, herbicides, and insecticides fall on the United States each year. There are 600 active ingredients in these pesticides; the EPA has given safety approval for six. Combining active ingredients with inert ones creates approximately 35,000 different commercial compositions. Scientists have analyzed the health effects of less than 10 percent of these compositions for health effects (Perfecto, 1992). Often the inert ingredients, in combination with the active ingredients, become as, or more, toxic than the active ingredients alone. Inert ingredients are not regulated under the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA); the public has no right to know what these ingredients are, even if an individual is poisoned (Moses cited in Bullard,1993). One report estimates that over 300,000 farm workers suffer from illness related to pesticide use annually (Pollack and Grozuczak cited in Perfecto, 1992). Another source claims that 800 to 1000 farm workers die in America as a result of exposure to pesticides each year (Pollack and Grozuczak cited in Perfecto, 1992).

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[12] A migrant farm worker's life expectancy is 49 years, his or her average income, a scant 6,000 per year (Perfecto, 1992, 184).

Again, children are at great risk. Although children may or may not work in the fields, parents often bring their children to work in the absence of childcare. Unborn children are exposed to toxins when their pregnant mothers work in the fields. Even when children do not go into the fields, they are still exposed to pesticide residues on family members' workclothes and contaminated soil on shoes. Furthermore, many laborers live near the fields upon which pesticides are sprayed; these individuals risk exposure to drifting chemicals in the air, on the ground, or in the water table (Moses, 1993). Many times these workers live near the fields and their drinking water may be contaminated. In 1991, the EPA found 191 water violations in the water systems serving farm workers (Cushman, 1992, C4).

One study maintains that 90 percent of the United States' two million hired farm workers are from ethnic or racial minorities. The majority are Chicanos. The rest of these minority workers are almost all Caribbean blacks and African-Americans (Perfecto and Velazquez, 1992). A 1990 Department of Labor national survey found that 77 percent of farm workers identified themselves with racial or ethnic minority groups (Mines et al., 1991 cited in Moses, 1993).[13] Ninety percent of the agricultural workforce in California is Latino of Mexican origin (Martin et al., 1985 cited in Moses, 1993). Although

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[13] Of this 77 percent, two-thirds were born in a country other than the United States. Ninety-two percent were born in Mexico while the rest of the sample were born in another Latino country (four percent), Asia (three percent), or the Caribbean (one percent). Of the one-third born in the United States, 34 percent were Latino, five percent were African-American, and one percent were from other ethnic groups such as Native Americans or Asians. The rest of the sample was composed of whites of non-Latino descent (Mines et al., 1991 cited in Moses, 1993).

conclusions differ about the exact number of racial and ethnic minorities employed in farming, clearly they comprise the majority of farm laborers.[14]

No extensive study assesses the extent of pesticide exposure for farm workers, but some evidence suggests that workers exposed to pesticides have an above average incidence of many acute conditions, including chemical burns, cancer, sterility, birth defects. Their death rates is above average too (Moses, 1993, 166).[15]

Uranium mining

The mining and milling of uranium ore generates large amounts of radioactive and hazardous wastes called "mine and mill tailings" (Robinson, 1992). Large uranium reserves are on four Confederate Tribal Lands, the largest of which belongs to the Navajo Nation (Robinson, 1992). Presently, industry deposits the bulk of the United States' radioactive uranium tailings on Native American land.

Health statistics testify to the Navajo Indian population's high level of exposure to uranium and its byproducts. Sixty percent of those employed on-reservation work at occupations related to uranium mining (Jorgensen, 1978 cited in Vaughan and Nordenstam, 1991). Miners are exposed to radioactive gas which at least one study determined to be carcinogenic (Brodine, 1973 cited in Vaughan and Nordenstam, 1991). Mining uranium ore probably lies behind the rate of lung cancer mortality among the Navajo population.[16] Furthermore, in 1981, the Navajo Health Authority found that

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[14] It is difficult to determine the distribution of the farm worker population because some of these workers are illegal aliens.

[15] The length of time between exposure and the development of a chronic health condition--or clinical latency--can be 10 or more years (Moses, 1993). Studies of this length are especially problematic when researching migrant populations

[16] According to one estimate, uranium miners are ten times more likely than other individuals to die from lung cancer (Freudenberg, 1984, 23).

reproductive organ cancer rates for Navajo teenagers living near uranium mining sites were 17 times the national average (cited in Wheale, 1993, 5).

Industrial workers

Several industrial occupations with above average rates illness and injury--including fabric milling, hospital orderlies and attendants, laundry and dry-cleaning work, service industries, smelting, and tobacco manufacturing--have a disproportionate number of African-American employees (Wright, 1992, 124). These occupations all have the potential to expose workers to environmental hazards. Data concerning industrial worker exposure to environmental hazards show that an African-American suffers a 37 percent greater chance of occupational illness or injury than a white worker and has a 20 percent greater chance of dying from occupational injury or disease.

Other minorities also labor in occupations which expose individuals to high levels of environmental hazards Asian-American and Latino women comprise a high proportion of workers in the garment industry. Because of poor ventilation at their worksites, these individuals are routinely exposed to chemical solvents and thick dust in, what observers labeled, modern day sweatshops (Freudenberg, 1984; Branigin, 1997).

Dietary Exposure

Minorities can also encounter higher than average pollution levels in their diets. Native Americans consume disproportionately high quantities of fish for subsistence as well as cultural reasons. This consumption rate places Native Americans, at least in the areas studied, at high risk of dietary exposure to toxic chemicals (West, 1992, 15).[17] In the

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[17] Northern tribes, like those in the Great Lakes area, have been given greater attention to date. There is little evidence about Native American consumption of fish in other regions in the United States.

Great Lakes area, Native Americans ingest fish containing high levels of PCBs (West, 1992, 16). In the Pacific Northwest, the EPA is studying four Native American tribes to determine the effects of exposure to industrial contaminants stored in the fatty tissues of the fish that those tribes consume (Cushman, 1992, C4).

Other minorities eat more contaminated fish than do the general public. A study conducted in Detroit, Michigan finds that nonwhites, the majority of whom are African-Americans, on average consume more fish from the polluted Detroit River than do whites (West, 1992). A statewide study of Michigan fishermen and their families finds similar trends. In the Michigan study, African-Americans consume more contaminated fish than do whites, but Native Americans eat more fish than do African-Americans.

As discussed earlier, farm workers, the majority of whom are Latino, are at danger from their drinking water, but Native Americans are also at risk In an Americans for Indian Opportunity (AIO) survey, participants form the 48 Native American tribes in the survey cited water quality as their leading environmental concern. Sixty-five percent of the respondents depend solely upon groundwater for their water supply while 31% rely upon a combination of surface and groundwater. Tribes report outbreaks of waterborne disease on nine reservations and violations of EPA drinking water standards on 17 reservations. Because most individual water systems are not monitored, other similar problems elsewhere are underreported (Wenzel, 1992, 5)

The above evidence strongly suggests that racial and ethnic minorities in the United States are exposed to disproportionately high levels of environmental pollution and hazards. Controlling for income levels, studies of the siting of hazardous waste facilities find minorities frequently exposed to more of these hazards than the population at large

Explanations for these phenomena range from economics to social prejudice with a combination of the two. Although it is beyond the scope of this study to fully explore these explanations, the reality appears to be that environmental pollution is a fact of life where minorities live, where they work, and in what they consume to a greater degree than pollution effects the bulk of the white population.

## Minorities' Risk Perceptions: *Could* They Differ from Other Citizens' Perceptions?

### Risk Perception: Theories and General Findings

Risk is involved with every aspect of life; how individuals perceive risks matters to the psychological, physical, and social well-being of all people. As noted in Chapter 1, most individuals rely on risk perceptions or "intuitive risk judgments," not sophisticated technological or scientific analyses, to make sense of the risks to which they are exposed (Slovic, 1987, 280). Why are these risk concerns important? The most obvious political reasons are that policymakers must understand citizens' concern about risks to communicate effectively information about hazards and to create policies that are responsive to public concerns. This latter task is problematized by the climate of public distrust toward government risk communicators. The significant questions here concern ethnic and racial minorities. As members of apparently disproportionately exposed populations, do minorities respond in distinctive ways to hazards? Also, what kinds of differences might be considered typical?

### Defining risk

Many scholars debate the definition of "risk" (e g., Fischhoff et al., 1990). The standard econometric definition of risk is "the product of the probability and utility of

some *future* event" (Adams, 1995, 30). Some individuals conceive of risk in two dimensions: objective and perceived (or "subjective") (Royal Society for the Prevention of Accidents, 1983). Experts determine objective risk, laypersons or the public, perceived risk. Perceptions have significance in determining political behavior. Perceptions often matter as much as reality.

Those who would with define risk are generally frustrated in their attempts to distinguish between objective and perceived risk; the boundaries between these two concepts are not clear. Efforts to measure risk generate controversy.[18] Scholars argue that there is no way to "objectively" measure risk because "within the philosophy of science, 'objective' typically means something akin to 'independent of the observer'" (Fischhoff et al., 1990, 31). Experts may be informed observers, but even so they still operate with some level of subjectivity (e.g., Fischhoff, et al., 1981). Increasingly, researchers utilize the concept of perceived risk to overcome the uncertainty inherent in risk determination.

Risk perception theories

Although many studies address differences between expert and lay risk perceptions (e.g., Flynn et al., 1993), most studies exploring public concerns fail to address variations in concern about environmental risk within the lay population. The social diversity of America's population implicitly suggests group differences in risk perception, yet researchers seldom explore in any detail the empirical basis of such variability (Vaughan and Nordenstam, 1991). Still, the main scholarly assumptions about risk perception rest on a wide range of plausible theories and empirical findings. This research assumes that

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[18] See Fischhoff et al., 1990 for a description of this debate.

these theories and findings are not mutually exclusive, but rather are complementary and interrelated. One way to simplify both theory and finding is to group them into two categories. namely, psychological research and cultural (or social) research Most discussions of risk perception are rooted in psychological research. Cultural and social research is a newer way of looking at risk perception. Although this study recognizes the importance of both psychological and cultural theories (Covello and Johnson, 1987), the emphasis here is upon social and cultural factors in environmental risk concerns.

The psychological or cognitive lens. The majority of evidence and theory about perceived risk emerges from the psychometric paradigm. This paradigm utilizes quantitative evidence obtained from psychological scaling and multivariate analysis to create "cognitive maps" of risk perceptions (Slovic, 1987, 280-281).[19] Scholars using this paradigm stress that different aspects and meanings of risk are important to different individuals or groups based on such influences as the perceived catastrophic potential of risks and one's vulnerability to hazards (e.g., Slovic et al., 1985).

Psychological researchers have identified variability in risk perceptions. Several scholars argue that women and men differ in their environmental risk.[20] Many studies document differences between expert and lay persons' (or those not involved in scientific careers) perception of risk (Fischhoff et al., 1981; Flynn et al., 1993).[21] Furthermore,

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[19] Both revealed and expressed preference approaches have emerged from this paradigm. Where Chauncey Starr (1969) focused on "revealed preferences," Others (e.g., Slovic et al., 1985; DeLuca et al. in Covello, 1986) studied risk by looking at "expressed preferences "

[20] See Davidson and Freudenberg, 1996 for a recent review of this evidence.

[21] Fischhoff et al. (1981) outline five reasons why the public and experts disagree about risks. First, the distinction between "actual" and "perceived" risks is misconceived by the public and experts because there is no certainty that risks can be absolutely defined. Second and third, lay persons and experts talk different "languages" and solve different

Susan Hadden and others argue that the "public's understanding of risk is both rational and richer than the noting of risk embodied in most scientific risk assessments" (Hadden, 1991, 48, also see Slovic, 1987). Risk means more to the public than mere summary statistics like expected rates of mortality or numbers of working days lost. A lay person's "basic conceptualization of risk is much richer than that of the experts and reflects legitimate concerns that are typically omitted from expert risk assessments" (Slovic, 1987, 285).

Vincent T. Covello and Branden B Johnson (1987) summarize four main findings in the psychological research. First, individuals overestimate the risks involved with particularly visible or memorable events like airplane accidents. Clearly, the media's coverage of such disasters focuses attention on such events: two airplane incidents in 1996--a ValueJet and a TWA crash--spark substantial fear in many individuals, but the statistical likelihood of being in an airplane crash is actually one in 11 million (Triola, 1992). The public tendency toward overreaction is apparent in public perceptions of environmental risks, particularly from nuclear facilities. Generally, citizens overestimate the risk of nuclear accidents. Media attention given to accidents such as those at Love Canal and Chernobyl partially explain this public overreaction. Researchers have documented broad differences of opinion within the public about such accidents. For example, Ian Savage finds that African-Americans tend to have greater than average levels of trepidation about aviation as well as automobile accidents than whites (Savage, 1993)

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problems. Fourth, debates can disguise the actual risks Finally lay persons and experts disagree about what is feasible Although the authors examined disagreements about nuclear power, many of these reasons appear to cross-cut specific issues.

Second, the lay public has difficulty interpreting and comprehending statistically probabilities measuring risks This is especially true when information concerns small or unfamiliar risks, but experts also have difficulty interpreting probabilistic information, even though their knowledge can clarify some of these data (Fischhoff et al., 1990).

Third, the manner in which risk communicators present information can strongly influence risk perceptions, concerns, and selection. Psychological research shows that the way information sources, such as policymakers or the media, frame questions and issues can influence individual's views and choices of options (Tversky and Kahnemann, 1987; Kasperson et al., 1988). According to Amos Tversky and Daniel Kahnemann, "framing the consequences of a public policy in positive or in negative terms can greatly alter its appeal" (77). By characterizing the siting of hazardous waste facilities or a cement plants as creators of jobs rather than a pollution source, politicians or industry spokespersons can alter the public's view of a potential facility.

Finally, individuals consider several qualitative factors when assessing the seriousness of a risk. Factors such as the risk's catastrophic potential, the assessor's dread of hazards, and his or her personal vulnerability to the threat substantially effect risk perceptions. Risk can have different meanings to different individuals. Factor analysis has helped identify three main dimensions of risk: dread, unknown, and personal or societal. Based upon the William Lowrance's (1976) original suggestion of nine dimensions of risk, Paul Slovic, Baruch Fischhoff, and Sarah Lichtenstein (1985) used a principal components factor analysis to identify three central dimensions of risk The first two factors can be thought of as continuums. Slovic (1987) and Ian Savage (1993) each provide their own definitions of these factors or concepts. Dread risk is defined "at its high . . . end by

perceived lack of control, dread, catastrophic potential, fatal consequences, and the inequitable distribution of risks and benefits" (Slovic, 1987, 283). Ian Savage describes dread risk as when "people appear to have a great 'dread' of a hazard when it is catastrophic; if death is a long drawn-out event (e g., cancer); if victims are exposed to the hazard involuntarily; and if when exposed to the hazard, the victim cannot by personal skill or diligence avoid harm" (Savage, 1993, 414). Unknown risk is defined "at its high end by hazards judged to be unobservable, unknown, new, and delayed in their manifestation of harm" (Slovic, 1987, 283). Savage describes this type of risk as when "victims may not observe the hazard when it occurs, [do] not personally know the risk, or the .. probability or consequences of the hazard are not know to scientists" (Savage, 1993, 414). Societal or personal exposure risk "reflect...[s] the number of people exposed to the risk" (Slovic, 1987, 283). Savage describes personal exposure risk as "represent[ing] the relevance of the hazard to the lives of individual respondents" (Savage 1993, 414). The dread risk factor seemed to be most closely related to laypersons' risk perception (possibility of death resulting from an activity or hazard), risk adjustment (the determination of acceptable risk), and desired regulation (the judgment of how much regulation should exist in comparison with how much does). These psychological findings about risk substantially influence how officials and experts relay information to citizens.

The social and cultural lens. Studies documenting differences between experts and the public suggest that public concern over environmental risk varies. During the past two decades, the work of Mary Douglas and Aaron Wildavsky has made scholars more attentive to the cultural and social aspects of risk perception. Douglas and Wildavsky argue that people assess risks on the basis of the threat they pose to cherished values and

beliefs. People do not focus on risks "simply . . . to protect health, safety, or the environment. The choice reflects . . . [a society's] beliefs about values, social institutions, nature, and moral behavior. Risks are exaggerated or minimized according to the social, cultural, and moral acceptability of the underlying activities" (Covello and Johnson, 1987, viii). Understanding risks in this way moves scholars beyond assessing the rationality of individual self-interest and is especially useful when studying different societies or cultures and, more specifically, in studying differing cultural groups within a society. For example,

> slipping and falling on the ice . . . is a game for young children, but a potentially fatal accident for an old person. And the probability of such an event is influenced both by person's perception of the probability, and by whether they see it as fun or dangerous. For example, because old people see the risk of slipping on an icy road to be high, they take avoiding action, thereby reducing the probability. Young people slipping on and sliding on the ice, and old people striving to do the same, belong to separate and distinct *cultures*. They *construct* reality out of their experience of it. They see the world differently and behave differently, they tend to associate with kindred spirits, who reinforce their distinctive perspectives on reality in general and risk in particular. (Adams, 1995, 9)

Age is not the only variable that influences a group's or an individual's construction of reality and risk. Although some fragmentary, tentative evidence suggests the public perceptions of risk and environmental concerns relate to such social and cultural variables, as race, ethnicity, and gender (e.g. Vaughan, 1995a; Vaughan, 1995b), more study is needed. Scholars have not carefully documented or explicated risk perception differences *among* distinct ethnic and racial groups "because few systematic and detailed studies have been conducted on environmental risk perceptions and ethnicity, available data only allow for speculations as to how variations in the relationship between ethnicity and judgments have been summarized previously" (Vaughan and Nordenstam, 1991, 51). A greater

understanding of the social and cultural aspects of risk is needed, but this does not diminish the importance of psychological or cognitive variables. Individuals view risk through their own psychological lenses; the relevance of this cannot be understated. The present analyst seeks to enrich and amplify the research on attitudes about risk by exploring in greater detail and social breadth how different ethnic and racial groups view environmental risk.

This Study's Approach

Scholars need to bridge the gap between psychological and socio-cultural perspectives. Researchers have long recognized that any discussion of social and cultural factors--including interactions among individual families, communities, and the relationships between individuals and institutions--is missing from the psychological literature (Covello and Johnson, 1987).

The data used in this study are aptly suited to exploring the social and cultural aspects of concern about environmental risk. Indeed, if psychological variables alone could explain risk perception and concern about environmental risk, one would not observe systematic intergroup differences (e.g., race or ethnicity-based differences) among the focus groups. The present research examines how disproportionate levels of hazard exposure affect these groups. By exploring social and cultural variation among minority populations, this research advances our understanding of the effect that race and ethnicity can have in constructing attitudes about environmental risk related to public policy and their relevance to making such policy.

## Minorities' Risk Perceptions: *Do* They Differ from Other Citizens' Perceptions?

### Empirical Findings on Minority Risk Perception

Several studies provide evidence that ethnicity and race significantly affect attitudes about risk; however their results are difficult to interpret because of methodological inconsistencies and limitations.[22] For the most part, researchers derive evidence concerning minority risk perceptions from survey research. Most of these studies find differences in risk perceptions by minority status, but there is no consensus about the level of environmental concern expressed by different racial and ethnic groups.

### Higher Levels of Concern About Environmental Risk

Recent studies tend to include demographic variables in their models of risk perception (e.g., Desvousges, et al. , 1993).[23] Studies that control for income and educational variables are particularly salient to the present research. Two of these studies already discussed in this dissertation find race and/or ethnicity to be significant in explaining variations in risk perception.[24] Ian Savage (1993) incorporates several demographic variables in his model explaining dreading hazards. The variables with the best explanatory value for "dread risk" were race, level of education, age, and gender.[25]

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[22] For a comprehensive review of these studies, see Vaughan and Nordenstam, 1991.

[23] The study by Desvousges et al.study (1993), "Perceived Risk and Attitudes Toward Nuclear Wastes: National and Nevada Perspectives," included both a Nevada and a national sample. Nonwhites tended to view repository risks as more serious than whites, even when controlling for income, in the national sample. Interestingly, the same pattern is not seen in the Nevada sample where race is not significant in explaining perception. Education was also significant in the national sample, but not in the Nevada sample. In the national sample, the more years of schooling an individual had the lower his or her risk perception. In effect, education could be collinear with income.

[24] See Ian Savage (1993) and James Flynn, Paul Slovic and C.K. Mertz's (1994) survey research work.

[25] Savage also looks at two other risk factors: whether the risk is known and personal exposure to the risk. The findings relating to these factors did not find the same significance as that for the dread factor.

Individuals who were African-American, younger, female, or less educated exhibited the highest levels of dread risk.

James Flynn, Paul Slovic, and C.K. Mertz's 1994 study validates Savage's findings that race consistently affects risk perception. Moreover, Flynn and his colleagues examine the attitudes of "nonwhites" (Latinos, blacks, Asians, and American Indians) while Savage included only African-Americans. Although Savage looks at several types of general risks, Flynn concentrates specifically on environmental health risks and concludes that nonwhites are especially concerned about pollution from chemical and nuclear wastes.

Other studies find that racial and ethnic minorities have greater levels of fear about technological or environmental hazards than do whites. Two of these studies discover a "white male effect" where those "likely to see themselves as the beneficiaries of a technological society (white, higher-income, better-educated males)" have lower levels of concern than white females or nonwhites (Pilisuk and Acredolo, 1988, 22; Flynn et al., 1994). One explanation for this lower level of concern is related to "trust in institutions and authorities and a disinclination toward giving decision-making power to citizens in areas of risk management" (Flynn et al., 1994, 1106). This empirical evidence confirms both minority and majority variation in risk perception.

Lower Levels of Concern About Environmental Risk

Findings from other studies suggest minorities have lower levels of concern about environmental risks than the bulk of the population. Elaine Vaughan argues that a sense of personal control affects the ways that different ethnic and racial minorities perceive risks (Vaughan, 1993, Vaughan, 1995a). Minority populations with less personal control

over the risks to which they are exposed tend to deny these risks: in a study of male, mostly Mexican immigrant farm workers in California, Vaughan finds that those workers who thought they had no other employment options discounted exposure to pesticides, reported fewer self-protective measures, and believed that they had less control over adverse pesticide-related health effects than the rest of the population (1995a).

Variation in Levels of Concern About Environmental Risk

Yet, another study documents differences in perceptions *among* ethnic groups (specifically, blacks, Anglos, and Mexican-Americans). Ralph H. Turner and K. Jill Kiecolt hypothesize that variability exists among ethnic and racial groups in regard to fatalism and certain risks (Turner and Kiecolt, 1984). These researchers predict that blacks and Mexican-Americans are more fatalistic about earthquakes than Anglos, but their data show that this is not the case Although blacks are considerably more fatalistic about such hazards, and Mexican-Americans have similar levels of fatalism to Anglos. When age and stratification are controlled, Mexican-Americans actually are less fatalistic than the Anglos. Turner and Kiecolt offer a social and cultural explanation for these findings. They maintain that Mexican-Americans do not have the same "cultural lens" as blacks (Turner and Kiecolt, 1984, 677).[26]

Limitations of Previous Studies

Scholars identify several difficulties in determining variations in risk perceptions as they relate to ethnicity and race. Some of these difficulties reflect the methods chosen to

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[26] Turner and Kiecolt also look at the "social class hypothesis" and the "discrimination hypothesis." The social class hypothesis argues that social class, not minority status, is responsible for the disadvantages that some minorities face. The discrimination hypothesis proposes that prejudice and institutionalized discrimination is responsible for minority disadvantage. These authors tend to agree more with the "cultural lens" explanation.

measure these perceptions, others have to do with operationalization, and still others concern levels of specificity. Vaughan and Nordenstam (1991) outline three main methodological shortcomings that could explain inconsistencies in the findings about ethnic and racial minority risk perception. First, the operationalization and measurement of "risk perception" or "environmental concern" varies across studies, thereby making generalizations impossible. Some studies use self-reported attitudinal measures to assess risk perception or environmental concern (e g , Turner and Kiecolt, 1984); others employ behavioral measures such as involvement in environmental groups to study these concepts (e.g., Taylor, 1989). Some studies using self-reported attitudinal measures tend to find nonwhites to be *more* concerned about environmental risk than are whites: studies employing behavioral measures generally indicate that minorities are *less* concerned about environmental risk than are whites (Vaughan and Nordenstam, 1991).

Second, researchers measure risk perception with different levels of specificity. Flynn's study finds that nonwhites greatly differ on their perceptions of risks depending upon the hazard; they tend to be more concerned about pollution from chemical and nuclear wastes than about ozone depletion (Flynn et al., 1994, 1105). Many studies have a problem with their level of specificity and tend to group all "nonwhites" together. As Turner and Keicolt (1984) indicate, there may be considerable variation in the perceptions of different ethnic and racial groups. Lumping all nonwhite groups in one category glosses over important cognitive and cultural differences.

Third, there may be an association between socioeconomic status and risk perception. It is also likely that socioeconomic status and race and ethnicity are

correlated. Some scholars argue that, in effect, education level or other socioeconomic[27] factors are more important than race or ethnicity in explaining exposure to and perception of risk.[28] Rather than viewing education or income as rival explanatory variables to race or ethnicity, race and ethnicity can be explored keeping in mind the possible effect of socioeconomic status. It is the view of the present author that the costs outweigh the benefits of disaggregating socioeconomic status and race and ethnicity.[29]

The survey research approach that predominates in risk perception study has several methodological limitations. Telephone surveys are inherently limited in gaining information about minority perceptions of environmental risk; some surveys have low minority response rates and are hindered by an absence of phones in many low-income households (Lavrakas, 1993). Flynn and his colleagues' study's (1994) response rate is comparatively good, but still only 50.7%. Additionally, their sample size is not large enough to disaggregate the nonwhite category. Savage's study (1993) only looks at race (African-Americans vs. whites). There are other problems in these studies. For instance, those in the Flynn study were nonwhite *English* speakers indicating that the minorities interviewed were not representative of many nonwhites in the United States. [30]

Beyond methodological problems, there are other disadvantages to the survey research approach. The lack of spontaneity in questions and lack of richness and ingeniousness in response mitigates against in-depth understanding of complex

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[27] In particular, income.

[28] See Been, 1994 and GAO, 1995.

[29] See Chapter 4.

[30] Flynn et al. acknowledge that it is problematic to interview only English-speaking nonwhites.

relationships such as those addressed by the present study. The survey researcher dictates the asking of questions and definition of phenomena are defined; this inhibits respondents from expressing how and why they think as they do. Assessing public opinion and concern requires more than simple responses.

Addressing Previous Methodological and General Limitations

The nature of the data and the method of analysis used in this study alleviates many problems. Focus group data eliminates the problem of imposing a specific operationalization of risk perception or environmental concern onto the subjects, as that survey research tends to do. The focus group format allows respondents to develop and explain their views about risk and the environment. Furthermore, problems associated with grouping minorities together are alleviated because of the specific structure of the focus groups (which were broken down by race and ethnicity).[31]

## Environmental Racism Indicates Differentiation in Risk Perception and Trust Among Ethnic and Racial Groups

Often, variations in social attitudes about risk are the source of individual, group, and community political activity: grassroots organizations in the Environmental Justice Movement (EJM) typify political groups that formed because their members perceived that they were exposed to greater environmental risks than the bulk of the population. Members of the EJM contend that the mainstream environmental movement and most local politicians are incapable of representing their interests. Policymakers need to take these grassroots groups into account precisely because their members feel that they are being discriminated against on many levels, including environmentally. The EJM is

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[31] See Chapter 3.

significant in understanding the political manifestation of minority group-based distinctions in concern about environmental risk and trust (or lack of trust) in risk communicators.

As discussed earlier, several studies indicate that minorities are regularly exposed to more environmental hazards than are whites Concomitantly, risk perception theories suggest that different groups vary in their views about environmental hazards or risk A key factor, specific to minority concern about environmental risk, is the concept of environmental racism. Risk perception studies focused on minorities often include such variables related to socioeconomic status such as income and education. Differences in risk perception by race and/or ethnicity exist even when controlling for these other variables (e.g., Desvousges et al ; Flynn et al , 1994; Savage, 1993). The purpose of the present project is not to disaggregate income or education from race/ethnicity. The explanatory value of race/ethnicity--controlling for income and education--in previous survey research models indicates that race/ethnicity is a variable that needs to be examined in greater detail. Much of the evidence and findings discussed in earlier sections of this chapter support the concept of environmental racism.

What Is Environmental Racism?

Scholars from many fields have recently started to study environmental equity and environmental racism.[32] Although researchers have given more attention to environmental racism in the last few years, protests about and references to environmental racism have been in existence for over a decade. According to an Environmental Protection Agency (EPA) Report, environmental equity is "the distribution of environmental risks across population groups and... policy responses to these distributions" (United States

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[32] For example, see Bullard, 1990.

Environmental Protection Agency, 1992, 2). When these risks are not evenly distributed, stakeholders question the existence of environmental justice Environmental racism is present when the unequal distribution of environmental risks can be attributed to prejudice or discrimination against ethnic or racial minorities.

Studies by the UCC Commission for Racial Justice (1987) and the Center for Policy Alternatives (1994) both conclude that the most significant variable in siting hazardous waste facilities nationwide is race and ethnicity. Other studies find a direct relationship between race/ethnicity and the scope of government action in enforcing regulations (e.g., Lavelle and Coyle, 1992). Marianne Lavelle and Marcia Coyle demonstrate that hazardous waste laws are more stringently enforced in white communities, and officials take 20 percent longer to place minority communities on the priority list for Superfund cleanup. Furthermore, stiffer cleanup penalties face polluters of white neighborhood sites than those facing polluters of nonwhite sites (Lavelle and Coyle, 1992).

The Environmental Justice Movement

This evidence of disproportionate exposure by race and/or ethnicity and the Not in Anyone's Backyard (NIABY) phenomenon--where all individuals (regardless of race or class) resist increased pollution--led to a new kind of environmental movement. The EJM's aims to combat environmental racism. The EJM concentrates on social justice, and some scholars describe it as an extension of the civil right movement (e g , Bullard,

1990).[33] The EJM incorporates ideas and strategies from both the civil rights and the mainstream environmental movements

The organizations and protests associated with the EJM concentrate on cleaning up past and present environmental degradation as well as the siting of LULUs (Locally Unwanted Land Uses). The purpose and origins of the EJM highlight the political dimension of the conflict over exposure to environmental risk and indicate minority interest and concern with this conflict.

The EJM: Organized Against Environmental Racism

Some of the groups involved with the EJM illustrate its main goals, motivations, issues, and participants. African-Americans in Savannah, Georgia formed Citizens for Environmental Justice to demand the permanent closure of the Savannah River Site nuclear plant after it leaked radioactive tritium into the Savannah River late in 1991. The group now focuses on other inequities such as the building of African-American Chatham County neighborhoods on dump sites. Dr. Mildred McClain, the group's founder, considered joining a predominately white environmental organization, but decided that "blacks tend to get lost in the mix in the white groups. I wanted a group that could focus specifically on issues that relate to the black community" (Davis, 1992, D4).

Another organization in the EJM--the West Dallas Coalition for Environmental Justice--is one of the most visible and largest minority organizations to date. The goal of this coalition of over 2000 African-Americans and Latinos for the soil to be cleaned up at a lead smelter site that closed in 1984 after 55 years of operation. Lawsuits filed by the

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[33] Like the Civil Rights Movement, the Environmental Justice Movement started in the southern United States.

coalition against local, state, and federal agencies claimed that hundreds of local citizens suffer from lead poisoning. The coalition maintains that discrimination in housing, land use, health and environmental-cleanup policies is directly responsible for the poisoning (Suro, 1993, B7).

Opposition to proposed Locally Unwanted Land Uses (LULUs) often spark organizational efforts. The response of many middle-class communities to the siting of LULUs is the Not In My Backyard (NIMBY) phenomenon, but these movements seldom address themselves to the backyards where the polluting industries and hazardous waste facilities are eventually transported or sited. Many residents of low-income communities are desperate for development. Local officials practice "YIMBYism" which is "yes, in my back yard" (Pollock et al., 1992), but the sites are not put in the official's backyard. When an industry, regardless of its potential environmental impact, promises an expanded tax base and employment opportunities, the local government tends to leap at the proffered opportunity before considering its residents' viewpoints. The EJM protests such actions: two recent minority protests prevented the siting of hazardous facilities, one in Louisiana and the other in California.

The citizens of Wallace, Louisiana, where the population is 98 percent African-American, prevented the Taiwan-based Formosa Plastics Company's $700 million wood pulp and rayon plant from being located in the town. Located in "Cancer Alley" or the "Chemical Corridor," Wallace sits in the 130 mile long and 30 mile wide strip from Baton Rouge to New Orleans that attracts many environmentally unfriendly industries. Governor Buddy Roemer and local politicians supported the plant because it promised an influx of jobs. Opponents of the plant included Wilfred M. Greene, a black retired school principal,

who stated that "politicians here never once dreamed this plant would drum up this much opposition. They will never try this again" (Marcus, 1992). Approximately 140 industries have already located in the region, but the once enthusiastic welcome to industry has given way to the concerns within the community as voiced by minority, environmental, and historic preservation groups

In 1991, residents of Kettleman City, California prevented the siting of the state's first commercial hazardous waste incinerator due to a deficient environmental impact investigation. Kettleman City, in Kings County, comprised of 95% Latinos, is already the site of the fourth largest hazardous waste landfill in the United States. Although Latinos were not represented on the Kings County board of commissioners (the siting authority); they were going to be the ones most effected by the proposed Chemical Waste Management's commercial incinerator (Wheal, 1993, 6).

As mentioned above, several recent discrimination lawsuits filed by residents in minority and low-income neighborhoods illustrate environmental concerns in these communities. Chester, Pennsylvania residents charged the state with environmental racism because of the concentration of waste-processing plants in the community. Their complaint maintains that the state violate the equal protection laws in the Civil Rights Act (1964) by granting 5 permits for waste-processing centers in their black-majority community since 1987. In that county, white communities have 3 waste sites while black neighborhoods support 8 such commercial sites (Janofsky, 1996, A13). The Chester suit is unique because it sues the state for discrimination leading to adverse health effects instead

of suing an industry, industries, or a governmental agency. [34] This type of suit and the organization of groups in the EJM are political manifestations of community concerns about environmental racism. These concerns indicate that minority exposure to and perception of risks is different than that of the bulk of the population.

## Research Questions

Relatively few empirical studies in the literature concerning risk perceptions among minority groups explore differences among minorities' perceptions of the environmental risks to which they are exposed. Nor have scholars related these perceptions to trust in government and other social institutions. Studies of environmental racism suggest disproportionately high minority exposure (in comparison with the bulk of the population) to environmental risk which in itself exacerbates minority distrust in these institutions. The literature on risk perception, however, does little to document concerns about environmental risk's relationship to repositories of group trust in risk communication, or about possible variations in the relationships among minority groups. This study clarifies these relationships by asking four questions:

(1) Do significant differences exist among racial and ethnic minorities in their concern about environmental risk and trust in sources of risk communication at the DOE sites?

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[34] Most suits are brought against a specific industry. The arguments that many industries employ to disprove intentional discrimination (which is required to win most civil rights cases) are difficult to litigate. A commonly used argument is that the site was once surrounded by white working-class neighborhoods that have only recently become minority communities. Another is that the site was chosen for geological reasons. There are two other suits in which a community, one in Michigan and the other in North Carolina, is suing a state under Federal civil rights law. These suits have not gone to trial (Janofsky, 1996, A13).

(2) In what way(s) is concern about environmental risk related to trust in specific sources of risk communication at the DOE sites?

(3) Are there also differences among these groups in respect to the linkage between concern about environmental risk and trust in information sources?

(4) How might these findings be useful for policymakers involved in risk communication both at the DOE sites and elsewhere?

## Conclusion. The Significance for Policymaking of Minority Concern about Environmental Risk

The present research is especially relevant to risk management policy because minority concern about environmental risk has implications for the policymaking process. Policymakers can benefit from a better understanding of how the public and, in particular, ethnic and racial minorities perceive risk. If racial and ethnic groups vary in their concern about environmental risk, implementing mechanisms to address these differences or similarities can effect the policymaking process in four ways. First, the views of distinct ethnic and racial groups can effect how much and how credibly policymakers can communicate with minority individuals. Second, minority preferences for specific policy solutions or risk management alternatives are likely determined by their views of environmental risk. Third, policymakers' ability to implement decisions may be substantially effected by public responses: if a particular ethnic group does not trust or agree with the decisions of a government agency, then that agency may encounter great difficulty in carrying out its decisions. Finally, ethnic and racial variation in views about environmental risk may influence the policy structure or process itself as changes are made to accommodate minority attitudes.

# CHAPTER 3
# RESEARCH DESIGN

In 1994, the United States Department of Energy (DOE) contracted with the Consortium for Environmental Risk Evaluation (CERE) to assess public concerns about DOE nuclear weapons facility sites. CERE conducted a series of focus groups between 1994 and 1995 with individuals residing near nuclear weapons facilities. CERE selected six sites from different areas of the country. The data generated by these focus groups present an excellent resource for further exploration and clarification of issues central to the present research project. The following discussion explains the rationale for selecting the specific study sites, a description of the CERE study, and the methodologies that will be employed--content analysis and a multivariate statistical technique--to analyze the data

## Case Selection: Why These Sites?

In 1993, Congress instructed the DOE to produce a report "evaluating the risks to the public health and safety posed by the conditions at weapons complex facilities" across the nation (PL 103-126, October 28, 1993). The United States nuclear weapons program began with the Manhattan Project during World War II and continued to expand until the late 1980s. Today there are 132 DOE nuclear weapons facilities located in 30 states around the nation. The United States has spent approximately $300 billion (1995 dollars) on nuclear weapon production, testing, and research from the Manhattan Project to the

present (U.S. Department of Energy, 1995, 3). The projected cost of the environmental cleanup of nuclear weapon sites ranges from 175 billion to 1 trillion dollars over 75 years (U.S. Department of Energy, 1996; Veiluva, 1996).[1]

In response to the congressional mandate, the DOE contracted out this report to a team of experts from consulting firms and academic institutions based at Tulane University and Xavier University of Louisiana. Awarding this contract helped to establish CERE, the organization charged with developing a credible, scientific approach to the estimation of risks associated with the DOE's environmental management activities under existing compliance agreements. The DOE also requested CERE to assess public concerns so that the DOE could include meaningful stakeholder involvement in the process of environmental remediation and cleanup. CERE elected to focus on six major facilities:

Hanford Site (Richland, Washington)
Savannah River Site (SRS) (Aiken, South Carolina)
Oak Ridge Reservation (Oak Ridge, Tennessee)
Rocky Flats Environmental Technology (Golden, Colorado)
Idaho National Engineering Laboratory or INEL (Idaho Falls, Idaho)
Fernald Environmental Management Program (Fernald, Ohio)

CERE chose these six sites because they experienced the worst environmental degradation and, therefore, posed the greatest threat to public health and safety. The DOE funding requests to cleanup these facilities indicate the extent of the damage at each location. Table 3-1 reports the 1995 congressional budget requests for each site.

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[1] See Chapter 1

Table 3-1: Environmental Management 1995 Congressional Budget Request for the Six Highest Funded Sites

| Site | 1995 Funding Request |
|---|---|
| Hanford | $1.6 Billion |
| Savannah River Site | $744 million |
| Oak Ridge | $671 million |
| Rocky Flats | $640 million |
| INEL | $497 million |
| Fernald | $294 million |

Source: Congresssional Budget Office based on data from Department of Energy, *Environmental Management* 1994, DOE/EM-0119 (February 1994).

## Site Descriptions

Each of these sites served a different function in the building of America's nuclear weapons arsenal; however, all suffered profound environmental degradation.[2] Hanford, like all the sites chosen for study, has a long history. In 1943, the United States Army Corps of Engineers selected this site to house a nuclear reactor and the chemical processing facilities necessary for the production of bomb-grade plutonium. Some fifty years later, the site's primary mission is no longer the production, separation, and purification of plutonium, but the treatment of the hazardous wastes previously produced there.

The Savannah River Site (SRS) served several purposes since its inception in the early 1950s. The military used it primarily for tritium production--a radioactive, gaseous form of heavy hydrogen that augments the explosive force of H-bombs. SRS poses one of the biggest challenges for environmental management. more than 650 contaminated buildings still stand on the site. As present, the site's mission is environmental restoration,

[2] See Makhijani, et al., 1995 for a detailed discussion of the damage.

support of the United States reduced defense needs as well as the storage, treatment, stabilizing, and disposal of waste

Although Hanford produced plutonium, the Oak Ridge reservation refined the uranium necessary for that production. Established in 1942 as a part of the Manhattan Project, Oak Ridge was a major supplier of enriched uranium for both military and commercial uses until 1987. Demand for uranium diminished after 1987: consequently, some of the Oak Ridge facilities closed. At present, Oak Ridge's main purpose is developing new nuclear weapons technologies and waste treatment.

Rocky Flats prepared plutonium for the nuclear weapons' trigger assemblies produced at this site. Between 1951 and 1989, Rocky Flats made these plutonium triggers, but in 1992 the DOE changed the site mission to environmental restoration and waste management. The new mission prompted DOE to rename the "Rocky Flats Plant" the "Rocky Flats Environmental Technology Site" in 1994.

Since the late 1940s, the Idaho National Engineering Laboratory's (INEL) has conducted nuclear research. INEL has witnessed the development and testing of several kinds of nuclear reactors. Although its focus has changed, INEL still supports research for federal agencies, including the DOE.

The facility at Fernald, Ohio closed in July 1991 after a long history of refining the uranium used in nuclear weapon manufacturing. The DOE formerly called Fernald the "Feed Materials Production Center" (a reference to the uranium "feed" for fuel rods); because of this name, many individuals living near the site thought that the facility made pet food or cattle feed (Hardert, 1993) Fernald is now engaged in environmental

restoration, waste containment and management, and the development of new technologies to facilitate these processes.

## Data Employed: Description of the CERE Study

To document public concerns, CERE went beyond the conventional public hearing format to gather data from local communities around nuclear weapons facilities.[3] CERE conducted focus groups at all six sites. The data sources used in this research are the transcripts of the focus group sessions, participant surveys (distributed at the end of the focus group sessions), and concern cards (distributed at the beginning of the session in which the moderator of the focus groups asked each participant to write down two or three local issues of concern to them at present). Using this data, this dissertation targets traditionally underrepresented groups--minorities and lower income individuals whose limited participation in the political process is often ignored by policymakers.

### Focus Groups

CERE constructed two types of focus groups: "Type A" and "Type B." Type A consisted of self-selected individuals, who responded to invitations to attend the focus groups, and, therefore knew that the focus group discussions would concentrate on the DOE sites. Type B contained individuals randomly selected from a pool of potential participants by professional marketing consultants. The pool drew from groups identified as being either underrepresented in policy making or disproportionately effected by risks at the DOE sites. Type B respondents were not informed that the discussion would center

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[3] See Appendix B for demographic profiles of the study areas. See Chapter 1 for a discussion of the incidents that have lead to mistrust in government and the DOE by citizens living near these sites.

around the DOE site until a predetermined time during the focus group meeting. Type B participants had little or no background in the issues discussed and had not participated in any previous meetings or activities at the site. CERE paid all the Type B participants a small stipend for participating in the sessions.[4]

In total, there were 60 Type A focus groups consisting of regulators, environmentalists, site workers, government officials, emergency responders, and proximate populations. Only three Type A groups appear in this study, all composed of Native Americans.[5] All other groups examined--African-Americans, Latinos, Asian-Americans, whites, downwind and downgradient populations, senior citizens, students, and occupationally-based groups (such as farmers and ranchers)--were Type B.[6]

CERE carefully designed the Type B focus groups to reflect different demographic segments of the population. CERE recruited these individuals using a prepared questionnaire structured to reveal certain demographic characteristics of the individuals and to place them in their appropriate groups. The groups were constructed by age, gender, race and ethnicity, rural residence, and proximity to each site such as "downwind" or "downgradient." Each group comprised between 5 and 12 participants and had a specific recruitment profile such as being all-African-American or all-Asian-American.

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[4] Robert Sevier (1989) and others argue that difficulty in recruitment justifies financial compensation of $20.00 or more. Because recruitment of minority and low-income participants proved extremely difficult, all participants in the Type B focus groups received compensation.

[5] See Chapter 7.

[6] In total, CERE conducted 44 Type B focus groups of which 29 are used in the author's content analysis of the focus groups. Senior citizens, students, and occupationally-based groups are omitted from the content analysis. All available Type B groups are included in the analysis of the participant profiles. Thirty-nine sets of participant profiles from the groups were available, and all are used for the multivariate statistical technique.

The downwind population includes "those individuals who live in the areas determined to be downwind from the installation based on airborne emission studies." The downgradient population contained "those individuals who live in the areas determined to be downgradient from the installation based on site characterization studies. Generally, downgradient populations are those in the direction of groundwater flow away from the installation" (CERE, 1995). Groups typically had balanced gender representation.

Trained moderators conducted the Type B focus groups in which a 27-question protocol with elaborating probes structured each discussion. For the three Native American groups (Type A focus groups), CERE employed a similar protocol.[7] Moderators asked a range of questions moving from those broad social issues and the quality of the environment to the environmental risks associated with particular nuclear weapons facilities. Each focus group session lasted from one and one-half to two hours. Early in 1995, CERE produced tapes and transcripts of the focus groups, and made them available to the author in mid-1995. As the largest focus group study related to risk perception ever undertaken, the CERE project generated considerable quantities of raw data

The 29 focus groups subjected to content analysis here consist of six African-American groups, five Asian-American groups, five Latino groups, and thirteen white groups. Combined, these groups contain 383 respondents. Eleven of the 13 white groups comprised downgradient or downwinder whites. Of the two remaining white groups,

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[7] Because of differences between the protocols, the researcher could not include the Type A Native American focus groups in the analysis See Appendix C for protocols.

one's selection profile was exclusively white without reference to location, the other, Appalachian (a regionally based category).

Participant Surveys

Moderators distributed a participant survey at the end of each focus group session Three hundred and eighty-seven individuals from the 40 Type B groups filled out this survey and answered demographic questions concerning gender, age, income level, and the number of children under age 21 in their household. Along with several other questions--incidental to the present study--respondents determined whether or not they considered themselves to be "an environmentalist."[8]

Concern Cards

The author used information collected at the beginning of the Type B focus groups in this analysis. After convening, the moderators asked participants to jot down two or three local issues that concerned them on note cards. CERE tried to prevent participants from obtaining prior knowledge of what the group would be discussing (so, that spontaneous mentions of environmental concern could be documented); however, in a few groups the moderator either revealed the topic of discussion or else participants insisted on knowing what the group would be discussing. This revelation did not affect the focus group discussions. Moderators collected concern cards for 35 of the Type B focus groups. Twenty-five inform this analysis.[9]

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[8] See Appendix D for participant form

[9] The 10 unused sets of concern cards came from senior citizen, student, or occupational (such as farmers or ranchers) groups, deemed inappropriate for this analysis.

## Why Focus Groups?

Although integral to social science research for the past fifty years, few recent political science studies rely on focus group procedures [10] The focus group method is "an interview style designed for small groups" (Berg, 1995, 68). Generally, focus groups involve between six and 12 people brought together under the direction of a moderator to discuss issues for up to two hours. Table 3-2 summarizes the strengths and weaknesses of focus group data. The major strengths and weaknesses of focus group data, as it pertains to this study, are discussed subsequently.

Table 3-2: Potential Strengths and Weaknesses of Focus Group Data

| Potential Strengths | Potential Weaknesses |
|---|---|
| 1. Discourse produced can be richer and deeper due to the control afforded participants (Sypher, 1994) | 1. Topic may interest some, but not others (Morgan, 1988) |
| 2. Findings do not always need corroboration, they can be "self-contained" (Sypher, 1994; Morgan, 1988) | 2. Recruitment of participants (Sypher, 1994) |
| 3. In a short amount of time, a great amount of data can be collected (Sypher, 1994; Morgan, 1988) | 3. Social desirability (Byers and Wilcox, 1991) |
| 4. Relatively low cost (Sypher, 1994, Krueger, 1994; Morgan, 1988) | 4. Cost can be too high (Sypher, 1994) |
| 5. Serendipitous findings (Sypher, 1994) | 5. Informal discussions are fluid and, thus, susceptible to tangents (Sypher, 1994) |
| 6. Educational function for the participants (Sypher, 1994) | 6. Lack of videotaping groups which prevents analysis of nonverbal communication (Sypher, 1994) |
| 7. Communicative function for the participants (Sypher, 1994) | 7. Not based in natural settings (Morgan, 1988) |

[10] An exception is Gamson, 1992. Another recent political science study uses focus group data in a study of the 1992 presidential debates due to "their open-ended nature" which allows the researcher to explore different issues as they arise within the format of a group discussion (Carlin, 1994, 13).

Table 3-2--continued.

| Potential Strengths | Potential Weaknesses |
|---|---|
| 8. Social function for the participants (Sypher, 1994) | 8. Affords the researcher less control over the data that are generated than would individual interviews (Morgan, 1988; Krueger, 1994) |
| 9. Moderator can probe unanticipated issues (Krueger, 1994) | 9. Some data can be difficult to analyze (Krueger, 1994) |
| 10. High face validity* (Krueger, 1994) | 10. Require moderators to have special skills (Krueger, 1994) |
| 11. Can potentially provide quick results if needed (Krueger, 1994) | 11. Variability in group dynamics (Krueger, 1994) |
| 12. As compared with other qualitative studies, capacity to increase the sample size of the study (Krueger, 1994) | 12. Difficulty in assembling groups (Krueger, 1994) |
| 13. Ability to explore topics and generate hypotheses (Morgan, 1988) | 13. Must be in a conducive environment (Krueger, 1994) |
| 14. Opportunity to collect data from group interaction (Morgan, 1988) | 14. Uncertainty as to whether interaction within the group reliably reflects individual behavior (Morgan, 1988) |
| 15. Can be used to explore not just what people think, but how they think and why they think that way (Kitzinger, 1995) | 15. Expression/articulation of group norms may silence individual voices of dissent (Kitzinger, 1995) |
| 16. Do not discriminate against people who cannot read or write (Kitzinger, 1995) | |
| 17. Can encourage contributions from people who are reluctant to be interviewed on their own (Kitzinger, 1995) | |
| 18. Can encourage contributions from people who feel they have nothing to say or who are unresponsive (Kitzinger, 1995) | |

* Face validity is whether the results *look* valid

## Major Strengths of the Focus Group Data Used in This Research

Several of the strengths of focus groups listed in Table 3-2 pertain to the focus group data generated by CERE. "Data generated from focus group interviewing tend to be richer, deeper, and qualitatively different than that supplied by other more traditional

methods; focus groups provide the texture as well as the substance, and the logic as well as the language of ordinary citizens" (Sypher, 1994, 42). The interaction between participants illuminates the logic and assumptions of the respondents; interaction allows individuals time to rethink positions, arguments, and opinions. Many times in the focus groups analyzed here, participants would agree with other participants' statements, or even rethink their own and other's arguments. Focus groups reveal citizens' viewpoints and the reasons *why* they think the way that they do. The use of focus group data allows participants themselves to emerge from the scholarship with their own voices intact.

Focus groups are "especially useful when working with categories of people who have historically had limited power and influence" (Morgan and Krueger, 1993, 15). Focus group sessions provide a secure environment for discussants to express their concerns. These groups

> allow multiple interviewees to respond in detail. In effect, they are intended to *empower* [italics added] respondents by allowing them to create what Mischler (1986) calls a 'speech event' where terms, issues, and meanings are not predetermined; where interviewees ask questions and produce narratives; and where both interviewees and respondents become engaged in conversation (Sypher, 1994, 38-39)

The focus group method allows individuals to express themselves freely, and expand upon points and arguments that are important to them. This "empowering" is important for individuals from marginalized groups who may not feel confident in expressing their opinions. This is particularly true for minorities whose views may have been ignored or criticized by other citizens.

The focus group format is beneficial when a culture gap exists between professionals and their target audiences; through this format, a researcher can identify the

shared and common knowledge held by a group In the view of one scholar, interaction within a focus group makes this form of data collection

> particularly sensitive to cultural variables--which is why it is so often used in cross-cultural research and work with ethnic minorities. . . . A method that facilitates the expression of criticism and the exploration of different types of solutions is invaluable if the aim of the research is to improve services. Such a method is especially appropriate when working with particular disempowered patient populations who are often reluctant to give negative feedback or may feel that any problems result from their own inadequacies. (Kitzinger, 1995, 300)

Among other major advantages, data from focus groups do not need corroboration, can be collected in a reasonable amount of time, and generally costs less to gather than data generated by quantitative studies. All these strengths support the use of focus groups to better understand public perceptions of the chosen DOE sites

## Major Weaknesses of the Focus Group Data Used in This Research

Table 3-2 lists the potential weaknesses of focus group data. In the CERE study, one might expect certain weaknesses to be potentially relevant: namely, a lack of participant interest (Morgan, 1988), the difficulty recruiting volunteers (Sypher, 1994) the loss of control over the data generated than individual interviews (Morgan, 1988; Krueger, 1994), and difficulty in analyzing some data (Krueger, 1994). The DOE sponsored focus group data suffer from only the last two of these problems.

Although focus group participants are often disinterested in the discussion topic(s), in the CERE study, the majority of respondents desired more information about risks from the DOE sites, and were articulate about their own experiences. Rarely did moderators have to stimulate discussion during focus group sessions. Historically, minority participants have been difficult to recruit for similar focus groups; however, a

CERE-hired professional marketing firm successfully recruited both whites and nonwhite participants.

Concerning control over the data generated, CERE's documentation of the focus group sessions poses problems for this analysis. CERE attributed participant responses on a "man" or "woman" basis. Although moderators were instructed to discourage one participant from dominating the discussion, there is no way to determine how many different participants were involved in any given exchange,

The approach used by CERE suffers at times from the well-known problem of interviewer effects (where the interviewer's personality or other characteristics effect the participant responses). This is especially problematic with focus groups because they are less scripted than other conventional interviewing formats. They give more discretion and latitude to moderators and this sometimes makes it difficult to make valid comparisons across groups.

## Validity of the Focus Group Results Compared With Survey Research

Richard Krueger argues that "*focus groups are valid if they are used carefully for a problem that is suitable for focus group inquiry*" (Krueger, 1994, 31). Krueger defines validity as "the degree to which the procedure really measures what it proposes to measure." He describes two types of validity. Face validity occurs when the results look valid to the researcher and tend to arise from several focus groups. Predictive or convergent validity is "the degree to which the results are confirmed by future behaviors, experiences, or events" and may vary substantially from group to group (Krueger, 1994. 31).

To assess the validity of the focus group format, Fred D Reynolds and Deborah K. Johnson (1978) compare a focus group study with a large scale mail-out survey Both methods of data collection were nationwide: an advertising firm sent a mail survey to 2000 females with a 90% response rate and conducted 20 focus groups in 10 cities Reynolds and Johnson compare the results of the two studies and find the level of agreement to be 97%. Moreover, where discrepancy appear, the focus groups prove to have a higher level of predictive validity than the mail survey (Reynolds and Johnson, 1978; Krueger, 1994).

## Methodology Employed

Content analysis, the principle method of analysis used in this study, should alleviate some problems that emerge in other studies of minority concern about environmental risk. Focus group data eliminate the need to impose a specific operationalization or definition of risk perception or concern about environmental risk, typically found in studies using survey research data. In the protocols, moderators asked participants such questions as "How serious do you think the problems are with the wastes at (name site)?" In responding to such questions, the participants directly respond and elaborate on how they view risks and explore what risk and environmental issues mean to them. Further, the organization of participants into ethnic, racial, and cultural groups avoids the common overaggregation of minority groups into one amorphous "nonwhite" category too often found in other studies of risk perception and political trust.[11]

This study utilizes two methodologies, content analysis and a multivariate statistical technique; it places primary emphasis on content analysis, used to analyze the

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[11] For example, the 1994 study by Flynn et al does not disaggregate nonwhites

focus group discussions and concern card responses. An ordered probit model using the participant profile data supplements the evidence The data from each focus group, made available by CERE and selected for use by the researcher, appears in Table 3-3.[12]

Table 3-3: Data Available and Selected for Use by the Researcher

| | Focus Groups | | Participant Profiles | | Concern Cards | |
|---|---|---|---|---|---|---|
| | Number* | People** | Number | People | Number | People |
| Type A | 3*** | 20 | 0 | 0 | 0 | 0 |
| Type B | 29 | 383 | 39 | 389 | 25 | 242 |

* Number of Focus Groups
** Number of people in focus groups
** Not included in content analysis

Because moderators asked different questions in the Type A groups (as compared with the Type B groups), the researcher had to omit these groups from the content analysis.[13]

Why Content Analysis?

Robert Philip Weber defines content analysis to be "a research method that uses a set of procedures to make valid inferences from text. These inferences are about the sender(s) of the message, the message itself, or the audience of the message" (Weber, 1990). Others consider content analysis more loosely as "any of several research techniques used to describe and systematically analyze the content of the written, spoken, or pictorial communication--such as books, newspapers, television programs, or interview transcripts" (Vogt, 1993). In content analysis, the researcher employs systematic and

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[12] See Appendix E for a list of which focus groups are used in each component of the analysis.

[13] The researcher discusses aspects of the Native American groups in Chapter 7.

objective recording and counting techniques to quantitatively represent a text's semiotic significance. Researchers using this method often "include a qualitative evaluation of the content for exploratory purposes" (Neuman, 1994, 262).

Although content analysis has not been widely used in political science, other social sciences, such as anthropology, psychology, and sociology, rely heavily upon it. Scholars use content analysis to illuminate many subjects. Researchers explore popular and elite culture through content analysis of song lyrics; others study gender dynamics through content analysis of small group discussions (Weber, 1990). According to W. Paul Vogt, "probably the most famous" application of content analysis occurred in the late 1960s when statisticians and psychologists used word frequency analysis to determine authorship of the *Federalist Papers* (Vogt, 1993). The best known use of content analysis in political science is Paul Lazarsfeld's study of German propaganda in World War II (Lazarsfeld, 1982).

Kris Krippendorff supports content analysis because it is "fundamentally empirical," "transcends conventional notions of content," and promotes "a methodology . . . that enables the researcher to plan, to communicate, and to critically evaluate a research design independently of its results." (Krippendorff, 1980, 9-10). Content analysis reduces substantial amounts of data into a few categories (Tesch, 1990). A researcher can calculate the frequency of comments in each content category to make broad conclusions from the data. Content analysis is the most appropriate method for this analysis because it allows the researcher to employ the same categories across group and, thereby, compare all groups used in the study.

Considerations for the Content Analysis of Focus Groups Used in This Research

Richard Krueger identifies several factors or potential problems that need to be addressed in analyses of focus groups: researchers must controll for the biases, edit messy quotations, allow for nonverbal communication in the focus group, compensate for the influence of the moderator or assistant moderator on the participants, and determine how to use of numbers in focus group results (Krueger, 1994, 153-156). All these factors were considered in this content analysis of the CERE focus groups. First, the analyst used coding rules and reliability checks to control for biases (see below). Second, although grammatical errors can be corrected if these changes do not alter the meanings of comments (Krueger, 1994, 154), the researcher only corrected typographical errors so that respondents' ways of expressing themselves remained intact. Third, nonverbal communication could not be addressed directly because the focus groups were not videotaped; however, the moderators' comments many times provided insight into how the respondents reacted to questions and to each other. The influence of moderators and assistant moderators on respondent comments was also addressed. In terms of coding, the moderator had to ask the protocol questions verbatim (or almost verbatim) for the researcher to include respondents' comments in the content analysis. In other words, when moderators deviated from the prescribed topic, the researcher did not code respondent's comments. The researcher included only questions asked to all groups. Further, in both focus group and survey research, the moderator should be ethnically or racially identical to the group participants because this encourages the participants to speak more freely about group or cultural concerns. In almost all the focus groups analyzed here, the moderator met this requirement. In the few cases where the moderator was ethnically or racially different than group members, the analyst took this into

consideration. In the few groups where the moderator was not the same race or ethnicity, participants reacted in a similar fashion to same race or ethnicity participant and moderator groups. The researcher also considered the role of the moderator in facilitating discussion. Some moderators were better than others in allowing enough time for participants to respond and in encouraging discussion. Generally, this had to do with the personality of the moderator and cannot be controlled.

The Quantitative and Qualitative Representations of Content Analysis

Holsti cautions that "content analysis may be considered as a supplement to, not as a substitute for, subjective examination of documents" (Holsti, 1968, 602). In this analysis, the researcher analyzes both the frequencies of comment mentions and the participant's comments. Thus, the symbolic content of the texts are both quantitatively and qualitatively evaluated and explored.

## Content Analysis of the Focus Group Data

The analyst performed content analysis on 29 focus group records to explore the relationship between minority status and risk perception, as well as the relationship between minority status and trust. Specifically, the analyst examined each focus group with the end result being a number of "mentions" of concern about environmental risk and repositories of trust.[14] This method is used to test the following two hypotheses:

$H_{Risk/Concern}$ Ethnic and racial groups will differ significantly in their concern about environmental risk.

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[14]The researcher used the same method in conducting the content analysis of the concern cards.

$H_{Trust}$ Ethnic and racial groups will differ significantly concerning the institutions and individuals in which each group places trust for information about the Department of Energy (DOE) nuclear weapons sites.

Creating and Testing the Coding Schemes

This researcher follows Robert Weber's (1990) guidelines for creating and testing coding schemes for the content analysis of focus group discussions. Weber's steps are:

1. Define the recording units.
2. Define the categories.
3. Test coding on sample of text.
4. Assess accuracy or reliability
5. Revise the coding rules.
6 Return to Step 3. [After completing Steps 3-5 for the second time, skip Step 6.]
7. Code all the text.
8 Assess achieved reliability or accuracy (Weber, 1990, 21-24).

This analyst followed these steps to create a coding scheme to reveal concern about environmental risk, repositories of trust, and local issues. This researcher documents the coding method in the following sections and also Appendices F through I.

Content Analysis: Concern about Environmental Risk

To assess concern about environmental risk, this researcher performed content analysis on 15 of the 27 questions asked during the course of the focus groups.[15] These questions dealt with environmental quality and the perceived risks posed by the sites. Moderators asked participants such questions as "Does this area have much air pollution?" and subsequent probes relating to the same question such as "What evidence of air pollution do you see, or what leads you to believe as much?" Following Weber's steps, the researcher devised a coding scheme for the respondents' comments, and then coded the text using a set of rules compiled after testing the coding scheme. The unit of analysis

[15] See Appendix F for a list of the 15 questions used

was a respondent's statement. The researcher coded each individual's comments as a single mention in one of seven categories: Not Relevant, Do Not Know, Not Concerned, Slightly Concerned, General Concern, Personal Concern, and Action Concern.[16] An exchange from the Hanford African-American group provides an example (coding listed in brackets after mention):

| | |
|---|---|
| Moderator: | Does this area have much air pollution? |
| Man: | I don't think they have an over-average amount, but what bothers me is this atomic stuff. That's what bothers me. If that stuff gets in the air, then that's a disaster, if too much of that gets in the air. You can't see it. You can't smell it, and you don't really know when you're getting it. [general concern] |
| Moderator: | Well, do you think there's air pollution now in this area? |
| Man: | Oh, there's some pollution. I don't think it's too bad, but I think it's some. [slightly concerned] |
| Moderator: | Okay. Anyone else think that there's air pollution? |
| Woman: | A lot of people get allergies. There's dust, a lot of dust and stuff, too. [general concern] |

After coding, the analyst calculated the frequencies of each category. The results of the content analysis appear in Chapter 5.

Content Analysis: Repositories of Trust

To determine which institutions or individuals were trusted in risk communication, an approach similar to the one used to assess concern about environmental risk was employed. During the course of the focus group protocol, moderators asked the following question in all 29 groups: "Who would you trust to give you accurate information about (Name site) and the activities at (Name site)?" The quantitative content analysis for trust derives from this question alone.

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[16] See Appendix G for definitions of these categories.

If respondents mentioned several sources, the moderator was instructed to ask the groups to rank those mentioned from most trustworthy to least trustworthy. Although, generally, the respondents did not rank these sources on a continuum, the participants did identify the sources that they viewed as least or most reliable. Again, the researcher created a coding scheme following Weber's steps. The unit of analysis was each mention of a source of trust. The author coded each of the mentions under one of the following general categories of trustworthy sources of information: "Governmental," "Personal," "Nongovernmental," "Industrial," and "No One." For example, two trustworthy sources were coded from the following exchange from the Oak Ridge Asian-American group (trustworthy sources are underlined and coding is in brackets).

| | |
|---|---|
| Moderator: | Who would you trust to give you accurate information about Oak Ridge? |
| Woman: | I would trust the media. The news media. It's hard for them to give wrong information to the people. [nongovernmental] |
| Moderator: | Somebody else? Who would you trust to give you accurate information? |
| Man: | I think they should hire a private organization. [nongovernmental] |

As with concern about environmental risk, the researcher compared the frequency with which each category appeared. The results of this content analysis appear in Chapter 5.

Content Analysis of the Concern Cards

The analyst applied content analysis to the 242 concern cards from 25 of the focus groups to gain insight into the mindset and worldview of the respondents. At the commencement of focus group interviews, moderators asked participants to list the two or three local issues that concerned them most. Following Weber's steps, the analyst developed a coding scheme and content categories based on what the respondents wrote

on the cards. Next, the researcher calculated the frequency of each local issue to draw comparisons across the ethnic and racial groups. The researcher coded and categorized the issues into the following categories. "Crime," "Education," "Government," "Economy," "Environment," "DOE Site," and "General Society."[17] The respondents' lists ranged from simple mentions like "crime" or "landfill"[18] to more elaborate statements such as "people imposing their will on others about cutting Social Security Benefits."[19] Both a quantitative (frequency of mention) and qualitative representation (examples from the concern cards and focus group discussions) of the content analysis appear in Chapter 6.

The Reliability of the Coding Used for the Content Analysis

The author conducted all coding and addressed reliability in two ways. First, if there was uncertainty as to which category a statement or mention belonged, the author showed this statement on a note card to three judges who placed that statement in a category based on the coding definitions provided. Two out of three judges had to agree. In all cases, two of the three judges agreed.

Second, another check for reliability involved coding by individuals other than the researcher. The researcher chose six of the 29 focus groups and five of the 25 sets of concern cards randomly, and checked for reliability by asking two other individuals to follow the coding rules and categories found in Appendices H, I, and J. The formula used in determining reliability was the Percentage of Agreement Index (PAI).

$$\frac{\text{Agreements}}{\text{Agreements} + \text{Disagreements}} * 100 = \text{PAI}$$

[17] See Appendix H for a description and examples of these categories.

[18] From the Oak Ridge Downgradient Rural Group.

[19] From the Fernald Appalachian Group.

Coding for concern about environmental risk received a PAI of 86.4%. Coding for trust received a PAI of 90.3%, while coding for local issues of concern had a PAI of 92%.

Multivariate Statistical Analysis of the Participant Profile Data

Several rival explanations of the effect of ethnicity and race on risk perceptions exist. The most important of these derives from a socioeconomic interpretation of differences among groups rather than a cultural or race and ethnicity-based approach.[20] Use of a multivariate statistical technique, an ordered probit, to test the following hypothesis was employed:

$H_{Concern}$ Ethnic and racial groups will differ significantly in their level of environmental concern.

Using an ordered probit model allows for a sophisticated multivariate approach that controls for other demographic variables in examining the influence of race and ethnicity on environmental concern. This method has two benefits. First, it allows for a testing of hypotheses about other variables that are posited to affect environmental concern. The second, and most important reason for using a multivariate statistical method is that it helps determine whether racial or ethnic status significantly effects the dependent variable, while controlling for variables suggested by competing hypotheses.

The dependent variable in this model is on a five point scale.[21] When the dependent variable is of this nature, the use of an ordinary least squares (OLS) regression is no longer appropriate. OLS assumes that the difference between any and all pairs of categories are separated by equal distances, when in fact there is no *a priori* theoretical

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[20] Socioeconomic interpretation of differences between groups focuses on income levels and class.

[21] For a description of all variables used in the model, see Appendix J.

justification for assuming equidistant categories. Because of the nature of the dependent variable, ordered probit is the appropriate method for this analysis. This maximizes likelihood technique uses the data at hand to generate threshold levels that separate categories, and therefore does not require the assumption of equal distances between categories. These thresholds represent the probability that a case will fall into any of the different categories (Greene, 1993; King, 1989). The results of this ordered probit model appear in Chapter 4.

## Summary

In 1994 and 1995, the Consortium for Environmental Risk (CERE) conducted focus group interviews with residents living near six major nuclear weapons facilities currently undergoing environmental restoration. CERE conducted this study to provide information on public concerns about the risks posed by these sites. CERE's data provide an excellent source for the exploration and clarification of many issues central to this research. Generally, focus group data are ideal for research in subjects with a lack of pre-existing theory. In particular, it provides qualitatively superior measurement and avoids the necessity of strong *a priori* restrictions on the information collected. This study examines the CERE focus group discussions through content analysis--a method rarely used in political science--to address the possibility of variation in risk perception or concern about environmental risk and institutional repositories of trust. Furthermore, the study employs an ordered probit model to establish that ethnicity and race is important in the determination of an individual's level of concern over environmental issues. The findings of this analysis appear in Chapters 4, 5, and 6.

# CHAPTER 4
# CONCERN ABOUT ENVIRONMENTAL RISK ACROSS ETHNIC AND RACIAL GROUPS

> In cleaning up [the Savannah River Site] . . . they have a problem. Not only with this site, but numerous sites all around the country. It's what are they going to do with the water? The radiated water. Remember a couple of years ago there was a barge off the east coast from New York to Maine--nobody would take their garbage because it was contaminated. They couldn't pay you to take it because it had radiation in it and it would kill the people. You can't put it in the ground, you can't put it in the ocean. They use to tell us a lie that they could put it in containers with liners in the container and the chemicals would stay for 200-300 years and it won't come back into the environment. That was a lie. It'll come right back up, it eats through it so they have a problem with it. That's the problem. We can clean it up and store it in a warehouse or on our shelves, but that's just prolonging the problem. That's not a solution. (African-American Man, Savannah River Site)

Substantial evidence indicates that racial and ethnic minorities in the United States are consistently exposed to more environmental hazards than the bulk of the population. Theories of risk perception, generally, anticipate significant variation in risk perceptions among citizens of the socially heterogeneous United States. In particular, social and cultural theories posit racial and ethnic variation in risk perception. However, relatively few empirical studies of risk perceptions or concern about environmental risk among minority groups clarify differences in how they perceive the environmental risks to which they are exposed.[1] Risk perception involves level of concern or worry about risks as well

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[1] Other studies take this into consideration. Savage (1993) examines whites and African-Americans and Flynn et al. (1994) study whites and "nonwhites."

as a myriad of other cognitive factors including how fearful individuals are about the catastrophic potential of hazards. The recognition of differences in concern about environmental risk among minority populations has significant implications for policymaking because these perceptions clearly have political consequences. The Environmental Justice Movement (EJM) organized precisely because minorities view their exposure to environmental risk as substantially different from that of the majority of the general population[2] and, variations among groups should cause policymakers to make distinctions in how they respond to these distinct ethnic and racial groups.

By combining content analysis with an ordered probit model, this analysis moves beyond previous studies which focus exclusively on survey data. These two methodologies--content analysis and an ordered probit model--reveal distinctions, not only between whites and nonwhites, as is typically done in empirical studies of minorities and concern about environmental risk, but also they permit a disaggregation of nonwhites into multiple ethnic and racial groups.

Further, data collection through focus group interviews allows the researcher to gain a more explicit understanding of how respondents view environmental risks than can be acquired through survey research.[3] This chapter examines different patterns of concern about environmental risk across ethnic and racial groups. Significant variation in these patterns clearly exist in the focus group interviews.

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[2] See Chapter 2.

[3] See Chapters 2 and 3.

## Concern About Environmental Risk

One purpose of the DOE study was to assess the magnitude and substance of public concern about the environmental and health risks posed by nuclear weapons facilities. In each focus group interview, the moderator was instructed to ask 27 similar questions and subsequent probes.[4] Participants were asked a range of questions starting with broad social issues and the quality of the environment, then narrowing to environmental risks associated with a particular nuclear weapons facility. This open-ended questioning allows for a richness of response not available from traditional survey research.

Fifteen of the 27 questions in the protocol are used in Table 4-1. These fifteen questions specifically dealt with environmental quality and the risks from the sites. For example, participants were asked "Does this area have much air pollution?" and followed by probes relating to this same question such as "What evidence of air pollution do you see, or what leads you to believe that there is not much?" Among the focus groups, those involving groups traditionally underrepresented in the political process--minorities and lower income individuals--as well as white comparison groups are included in this portion of the analysis.[5]

Content analysis applied to several focus group discussions determines the relationship between minority status and risk perception. Specifically, each focus group is

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[4] See Appendix C for the focus group protocol or procedures for the moderator.

[5] Of the 13 white focus groups conducted, two were not also either downwinder or downgradient individuals.

Table 4-1. Mention of Environmental Risk Concern By Ethnic or Racial Group*
Column Percents (Col. %) are in bold

| | Whites [13 groups 124 people] | | African-Americans [6 groups 62 people] | | Asian-Americans [5 groups 46 people] | | Latinos [5 groups 51 people] | | All Groups [29 groups 283 people] |
|---|---|---|---|---|---|---|---|---|---|
| | N | **Col. %** | N | **Col. %** | N | **Col. %** | N | **Col. %** | N |
| Do Not Know | 22 | **2**** | 23 | **4** | 15 | **3** | 19 | **4** | 79 |
| Not Concerned | 124 | **11** | 49 | **9** | 24 | **5** | 53 | **12** | 250 |
| Slightly Concerned | 206 | **18** | 80 | **15** | 118 | **25** | 179 | **40** | 583 |
| General Concern | 532 | **46** | 293 | **54** | 191 | **40** | 131 | **29** | 1147 |
| Personal Concern | 189 | **17** | 85 | **16** | 95 | **20** | 59 | **13** | 428 |
| Action Concern | 70 | **6** | 12 | **2** | 31 | 7 | 10 | **2** | 123 |
| TOTALS | 1143 | | 542 | | 474 | | 451 | | 2610 |

* Responses to 15 of the 27 questions asked in all focus groups analyzed here were coded. These questions dealt with the environmental quality and possible risks from the sites.
** Due to rounding error, column percent totals may not equal 100%.

characterized by the number of "mentions" of risk perception or concern about environmental risk.[6] The author used 29 groups--each exclusively composed of either African-Americans (6 groups), Asian-Americans (5 groups), Latinos (5 groups), or whites

[6] All the coding was conducted by the author. Six of the 29 focus groups were chosen randomly and checked for reliability by two other individuals. Coding for risk perception received an intercoder reliability coefficient of 86.4%. For a complete description of coding rules see Appendix I

(13 groups)--in the content analysis.[7] All groups together numbered 283 participants. Eleven of the 13 white groups were constituted from downgradient individuals or downwinders. One of the remaining two groups was simply white (i.e., not downgradient or downwinder); the other, Appalachian (a regionally based category). This is an important point because the downwinder and downgradient white groups are likely exposed to more risks than the rest of the white population in the United States. Thus, differences between whites and minorities are likely underestimated in this study.

Table 4-1 categorizes mentions of environmental concern or perceptions of environmental risk by ethnic or racial group. The first column identifies different categories of concern about environmental risk: Do Not Know, Not Concerned, General Concern, Personal Concern, and Action Concern. The category "Do Not Know" includes statements of respondent uncertainty or inability to answer questions due to lack of information. "Not Concerned" includes statements of unconcern about environmental quality or risks from the sites. The category "Slightly Concerned" involves statements of mild or qualified concern. "General Concern" is concern without qualifiers. The category "Personal Concern" includes comments about the respondent or individuals the respondent knows (e.g., parents, children, friends, or neighbors). "Action Concern" reflects a change in behavior. For example, a respondent now drinks bottled water because he or she is fearful of possible contamination from the site.[8]

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[7] CERE conducted the Native American focus groups using a different protocol (see Appendix C for Type A focus group protocol), and, thus, cannot be included in the quantitative content analysis, they are briefly examined qualitatively in Chapter 7.

[8] See Appendix G for complete definitions of these categories.

Table 4-1 provides the raw number of mentions as well as the percentage of total mentions per group (column percents). For example, African-Americans mentions of general concern occur 293 times, 54% of their total mentions. Column percents allow comparisons across all ethnic and racial groups

Table 4-1 indicates variation in concern about environmental risk across ethnic and racial groups. Moreover, this table captures variations in ethnic and racial groups not illuminated when they are aggregated into "nonwhites." In this respect, especially, the existing literature is limited in its discussion of different ethnic and racial groups. Asian-American concerns about environmental risk for instance, have not been addressed. Furthermore, Latino and African-American concerns about environmental risk have been compared only minimally.[9]

Three differences deserve special mention. First, perhaps the most important finding from this evidence is that African-Americans have the highest percentage of mentions of "general concern." Second, whites and Asian-Americans both had significantly more mentions of "action concern" than either African-Americans or Latinos. In particular, the expression of concern related to action is less prevalent among African-Americans--the group most likely to mention a general concern. Finally, Latinos have comparatively the smallest percentage of mentions, about general concern, personal concern, and action concern, but the highest percentage of mentions of "slightly concerned" and "not concerned."

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[9] See Chapter 2.

A closer look illustrates how each category of environmental concern displays differences ethnic and racial group risk perception. The following discussion examines environmental concern, by using the information from Table 4-1 to assess the frequency and typicality of environmental concern mentions. The qualitative content analysis enhances the description of group perceptions. Although evidence presented is based on focus group interviews and may not necessarily be generalizable to a larger population, the real advantages of these interviews lie in the richness and detail of the participant responses and the subsequent generation of testable hypotheses based on these responses.

"I Do Not Know": Uncertainty About Environmental Risk

Table 4-2: Relative Frequency of Mention of Uncertainty About Environmental Risk By Ethnic or Racial Group

| | Whites [13 groups 124 people] | African-Americans [6 groups 62 people] | Asian-Americans [5 groups 46 people] | Latinos [5 groups 51 people] |
|---|---|---|---|---|
| Do Not Know | Low* | High | Medium | High |

* High = Greater than 25% Above the Mean Number of Mentions Across All Groups
Medium = Between 25% Below and 25% Above the Mean Number of Mentions Across All Groups
Low = Less than 25% Below the Mean Number of Mentions Across All Groups

Considering the veil of secrecy surrounding the DOE sites until quite recently,[10] it makes sense that some individuals feel that they do not have enough information to assess environmental risk Moreover, since education level[11] also affects risk perceptions, one

[10] See Chapter 1.

[11] In fact, previous studies find that level of knowledge does affect judgments about risks (Desvousges et al , 1993).

expects that "nonwhite" respondents, in particular African-Americans and Latinos, may be more likely to reply to questions of risk with "I do not know" due to possibly reduced access to technological information. In Table 4-2, this turns out to be the case.

Whites are least likely to mention uncertainty about risk while African-Americans and Latinos are the most likely. Participants' comments in one of the African-American groups from the Savannah River Site typifies responses to questions about the nuclear weapons facilities: "I don't know enough about it." Although statements like these were made in the majority of the focus groups, these comments were more prevalent in the African-American and Latino groups

"I am Not Worried": Lack of Concern About Environmental Risk

Table 4-3: Relative Frequency of Mentions of "Not Concerned" About Environmental Risk by Ethnic or Racial Group

| | Whites [13 groups 124 people] | African-Americans [6 groups 62 people] | Asian-Americans [5 groups 46 people] | Latinos [5 groups 51 people] |
|---|---|---|---|---|
| Not Concerned | Medium | Medium | Low | High |

* High = Greater than 25% Above the Mean Number of Mentions Across All Groups
Medium = Between 25% Below and 25% Above the Mean Number of Mentions Across All Groups
Low = Less than 25% Below the Mean Number of Mentions Across All Groups

Claiming to be unconcerned about environmental risk may indicate something beyond lack of concern; it could also mean that the claimant does not feel that he or she has the knowledge or power to manage these risks (Vaughan, 1993). From this logic, it is expected that nonwhites would mention unconcern as a coping mechanism more often

than whites. As expected, African-Americans and Latinos did express unconcern about risks more often than whites. Not so obviously, Asian-Americans differed from other nonwhites in having a low number of mentions of "not concerned;" the next highest number of mentions is more than twice that of Asian-Americans. Table 4-3 reports these results.

A common response indicating a lack, or inability, to exhibit concern relates to eating fish caught in the area. One Latino man from INEL comments are illustrative.

Moderator: Let me ask that, who here fishes?

Man. Me, everyday.

Moderator: Okay. Can I see a show of hands? Okay. Ya'll fish. So then there's some people who do get out to the waters and stuff. Let me ask, do you catch the fish, or do you eat the fish that you catch?

Man. I do.

Other reasons beyond indifference could possibly explain unconcern. As mentioned above, some scholars argue that those who do not have a sense of control about their own lives disregard risks to which they are exposed as a coping mechanism. One INEL Latino man's evasion of a question about pollution may reflect such a mechanism.

Moderator: If you had to name the most important source of pollution in your community?

Man: (Speaking Spanish) *I live very content and happy.*

Here, the respondent addresses a question about his environment with a statement about his person. Although this participant's response may stem from pure unconcern, it is quite possible that evading the question is a coping mechanism for dealing with concerns about environmental risk. Other participants directly state that they do not want to know more about these risks. One Latino woman from the same Latino group declares: "do you tell

your husband everything that goes on? I mean, I think we're getting ridiculous thinking that the Government has to tell us everything. I think that we are better off knowing less." When asked if he wanted to have more information about INEL, a Latino man stated "we don't need it, the less you know, the less you worry about." Lack of control could help to explain why African-Americans and Latinos so often mentioned unconcern about risks from the sites.

"I am Somewhat Worried": Limited Concern About Environmental Risk

Table 4-4: Relative Frequency of Mentions of "Slightly Concerned" About Environmental Risk By Ethnic or Racial Group

| | Whites [13 groups 124 people] | African-Americans [6 groups 62 people] | Asian-Americans [5 groups 46 people] | Latinos [5 groups 51 people] |
|---|---|---|---|---|
| Slightly Concerned | Medium | Low | Medium | High |

* High = Greater than 25% Above the Mean Number of Mentions Across All Groups
Medium = Between 25% Below and 25% Above the Mean Number of Mentions Across All Groups
Low = Less than 25% Below the Mean Number of Mentions Across All Groups

Those exhibiting limited concern essentially see two sides of the coin. They are concerned, but it is not of great importance to them, or they believe current conditions are an improvement. Latinos have considerably fewer mentions of general concern, but they have significantly larger number of mentions of "slightly concerned" than any other ethnic or racial group.

For example, after describing the site and its operations, the moderator asked the participants how serious they thought the waste problems were with Rocky Flats. A Latino woman responds that she "would imagine the most serious damage has been done

in the early '50s, '60s, when they didn't know what they were dealing with. Now, at this point, we can just assume and hope that they are cleaning it up the best ways they can."

Several respondents mentioned the Savannah River Site as one of their concerns. The moderator, as a follow-up to these statements, asked if these concerns were "current concern[s] about pollution from the site, or from years past?" One Asian-American male respondent indicates only slight concern because he viewed the situation relative to private industry:

> The main problem with SRS--I'm trying to find out more about that place out there, because possibly in the next few years I'd like to get a job out there, maybe, in the Environmental Department. However, the problem with most nuclear facilities is that the view of secrecy, you know, it just causes doubts. It just--there's some bad thing going on, because they won't tell us about it. And in the last two years they have been allowing more people out there. I've taken a tour out there, and they're a lot safer than private industry. There are at least twice as many managers out there than any other private industry would have because our tax dollars are paying for all this.

As illustrated by the preceding quotation, although moderated concern was most prevalent among Latinos, it was also evident to a lesser degree among Asian-Americans and whites.

"I am Worried": General Concern About Environmental Risk

Table 4-5: Relative Frequency of Mentions of "General Concern" About Environmental Risk by Ethnic or Racial Group

| | Whites [13 groups 124 people] | African-Americans [6 groups 62 people] | Asian-Americans [5 groups 46 people] | Latinos [5 groups 51 people] |
|---|---|---|---|---|
| General Concern | Medium | High | Medium | Low |

* High = Greater than 25% Above the Mean Number of Mentions Across All Groups
Medium = Between 25% Below and 25% Above the Mean Number of Mentions Across All Groups
Low = Less than 25% Below the Mean Number of Mentions Across All Groups

Although some studies find nonwhites to be unconcerned about risk (as discussed above), other survey research studies lead one to expect nonwhites to exhibit higher levels of general concern than whites (Flynn et al , 1994; Savage, 1993). The authors of one such study argue that those who do not feel they have control over risks to which they are exposed have more concern about those risks; the researchers contend "perhaps ... nonwhite[s] ... see the world as more dangerous because they have less power and control" (Flynn et al., 1994, 1107). Although African-Americans did mention a general concern more significantly than whites, but Latinos did not and Asian-Americans respond similarly to whites

Table 4-5 presents the frequency of mentions of general concern. Every group gave some evidence of general concern. When asked if there was anything of concern about Oak Ridge, one Asian-American woman responded: "I think about cancer. I heard from my husband that it you live in a sixty-mile radius then you'll get cancer. It just concerns me because in my country, very rarely people die of cancer. And I'm thinking I live here in Maryville and it's a thirty minute drive [to Oak Ridge]." Asian-Americans tend to mention this kind of concern about as often as the total focus group average while African-Americans mention it more often than any other group.

The following exchange from a Savannah River Site African-American group illustrates this greater incidence of expressed concern:

Moderator: How serious do you think the problems are with the wastes at the Savannah River site? Any specific chemicals, materials, substances that you are concerned about out there? How do you compare these problems with other places with problems?

Man: They are very serious about it. Anytime you have a nuclear reactor you have that water which has radiation in it and they can't dispose

of it. They can bury it and they usually tried to build those deep holes and they're layered with concrete and other sorts of things that keep it from seeping back into the environment, but it doesn't do very well, so they are still housing it trying to find some way to dispose of it. The water that has radiation in it

Woman: I think it's a very serious problem because it keeps appearing in our newspapers and on the news and stuff about the water problems and the sewerage and stuff.

Woman: I don't understand it.

Man: I think it is a serious problem because that water comes down from Aiken, that plant down there in Aiken comes down the Savannah River and that's the water that we are using. I think that's very serious. But I don't know what they are doing about it.

Woman: I think it serious, but I don't know

Woman: There's a problem, but it seems that nobody is doing anything about it.

There is a great deal of uncertainty, but the prevalent feeling is that the risks from the sites are serious and need further attention. Other comments in the same group also indicate disagreement in the level of seriousness involved:

Moderator: How do you compare what we do know of the problems with other parts of the country. How would you compare the problems out there [at SRS] with other local problems?

Woman: This one is minute to others.

Moderator: Savannah River is minute compared to other local problems. Is this a common consent. .

Woman: No.

Man: If you have radiation in the water and you can't dispose of it, it's a very, very serious problem. The radiation will kill each and every one of us in here if we get too close to it. That's a very, very serious problem. We were talking about how it gets into the water. The EPA and the environmental people are saying it don't

supposed to get in the water, but it's still showing up in the water and we're still consuming mercury and lead from those leaks that the Savannah River plant has It's no different from this one than that Love Canal. When you have a nuclear site and you are making weapon grade plutonium for weapons and what not, you have a lot of wastes or a lot of residuals that you need to dispose of that humans can't come in contact with. And when you have things like that that you can't put in the ground because it'll come back up and you can't drop it in the sea because it'll contaminate the sea and you just got it sitting here on the shelf, that's a serious problem. You got to get rid of it some way and they don't know how to get rid of it. Moderator: How do you compare these problems with other local problems?

Man: I think that's one of the major . . . [problems, what is] in the water. I see brothers . . . there's a bridge right before you get to the Savannah, and I see brothers all the time fishing right over the bridge And they are pouring in right in there and it's contaminated the fish and the brother are fishing and they're taking it right home.

Woman. It's a very serious problem because the media keeps resurfacing the problem and I think this is just a act to buy more time. They keep saying to the public, I hear you, I hear you, I hear you, I'll keep putting this stuff in the paper showing you that I hear you but then you never hear anything happening from the resurfacing of the problem being restated over and over So something needs to be done.

The general implication of the collective focus group data is that the risks at these sites concern all groups, but African-Americans exhibit a greater level of concern. A possible explanation for this greater level of concern when compared with other groups, could stem from "black's more widespread skepticism, powerlessness, and pessimism, which emanate from a lack of significant gains in life situation, with little prospect for immediate improvement" (Turner and Kiecolt, 1984, 677).

"I am Worried for My Family": Personal Concern About Environmental Risk

Table 4-6: Relative Frequency of Mentions of "Personal Concern" About Environmental Risk by Ethnic or Racial Group

| | Whites [13 groups 124 people] | African-Americans [6 groups 62 people] | Asian-Americans [5 groups 46 people] | Latinos [5 groups 51 people] |
|---|---|---|---|---|
| Personal Concern | Medium | Medium | High | Low |

* High = Greater than 25% Above the Mean Number of Mentions Across All Groups
Medium = Between 25% Below and 25% Above the Mean Number of Mentions Across All Groups
Low = Less than 25% Below the Mean Number of Mentions Across All Groups

Personal concerns include mention of risk to specific individuals the respondents know (e.g., friends, family, neighbors, or self). As Table 4-6 shows, Asian-Americans have the most and Latinos have the least percentage of mentions in this category. The moderator of the Hanford Asian-American group asked the respondents if they knew any workers on the job who might have been exposed to something harmful to their health. One woman knew of two individuals:

> I know two friends. One is my sister's father-in-law, one is my friend's best friend. They both . . . [died] of cancer. Real bad cancer. From the time the doctor predicted that he knows he has cancer, he has about two months, he died in a lot of pain. Awful pain. And then the friend just passed away just five years ago. The same thing. They both work for Westinghouse [Hanford]. They both die of cancer. Then the one, the friend that just passed away a few years ago, lately his wife got a call from an attorney hired by some company in California. Asked her, " Do you mind if I dig up your husband's body to find if his death is related to the radio waves in Hanford area?" His wife said, "No, don't dig up, let bygones be bygones. "But you might get a million dollars, and she say forget about the money, it's not going to do me any good. What is gone is

> gone, you know. So I think, the wife says, nobody knows if the two deaths are related to the air waves. But nobody try to find out any direct reasons to that.

This woman's comments indicate that even though her friends suspect radiation from Hanford to be the cause of two deaths in their community these individuals, they did not take any formal actions to assess responsibility for these deaths This inaction could represent more than letting "bygones be bygones;" it also indicates that these individuals do not think that even if they did want to pursue a lawsuit against the Hanford management (Westinghouse) would not have to assume responsibility for these deaths.

When asked "Do you know of anybody . . . [who has] been, in your neighborhood, in your community who's been affected by any kind of pollution?", one African-American man from Oak Ridge cited an example involving a close family member:

> Man: It might have been a year ago, or whatever, but our family feel strongly that my father was killed by pollution.
>
> Moderator: What kind of pollution?
>
> Man: Exposure. He was supposedly either first, or second of black--put in the chemical of operating that 112 [Oak Ridge plant]. He was either the first or second one. And he was 29-years-old, dropped dead, and hadn't been able to get--find out what the autopsy said, or whatever he was in the process of suing for, contamination. The lawyers, way long ago and all this stuff. This is the stuff I've just come into within the past year or two. That is my family's strong opinion. I've talked to his sister, who's 83-years-old, and the rest of the family

Previous studies pinpoint personal concern (or personal exposure risk perception) as a significant form of risk perception (Slovic et al., 1985). Concern mediated through personal acquaintances has an important impact on the perceptions of the individuals in this study. In the exchange above, this African-American man discusses his views in terms

of a collective family view, this clearly suggests the importance of group relationships in shaping such perceptions.

"I Was so Worried, I Moved": Taking Action Because of Environmental Risk

Table 4-7: Relative Frequency of Mentions of Concern Along with Action About Environmental Risk by Ethnic or Racial Group

| | Whites [13 groups 124 people] | African-Americans [6 groups 62 people] | Asian-Americans [5 groups 46 people] | Latinos [5 groups 51 people] |
|---|---|---|---|---|
| Action Concern | High | Low | High | Low |

* High = Greater than 25% Above the Mean Number of Mentions Across All Groups
Low = Less than 25% Below the Mean Number of Mentions Across All Groups

Many studies various personal document actions based on environmental concern (e.g., ). In particular, some studies compare white and African-American participation in environmental activities according to their level of concern. Paul Mohai (1990) finds that environmental concern is similar for whites and African-Americans, but the result of this concern (e.g., "environmental" activities) are more likely to be seen in white populations. Although this trend may be changing with the emergence of the EJM, one would still expect whites to respond more actively to their perception of environmental risk because of the continuing dominance of whites in these types of activities. Indeed, Table 4.7 documents that this is the case.

Whites and Asian-Americans both have significantly higher percentages of action responses than either African-Americans or Latinos. Action based on these environmental concerns involved varied responses including drinking bottled rather than

tap water, refusing to eat fish and game, and relocating One male white downwinder now buys bottled water because of his close proximity to Fernald:

> Moderator: Do any of you have concerns about the water you consume at your home? Are there any problems with the quality of your water; and where does it come from? Is it a City system? Is it a well? We may have a variety.
>
> Man: I don't live very far from Fernald and ever since we found out about Fernald and what was going on there and so forth, we've been buying our water; and that's been many years--I guess, five, six, seven years.

Other individuals changed their habits as well, as an exchange between white downgradient rural participants from Oak Ridge portrays.

> Man: I used to take my kids over swimming at Chester Cross Park, which is in Middle Valley, and I don't enjoy it anymore. The water is nasty over there, the swimming area.
>
> Moderator: When you say "nasty" Roger?
>
> Man: Well, there's a lot of--
>
> Woman: You know what's wrong with it. It's pollution.

African-Americans stand out by expressing general concern at the same level as whites, but they were less likely to mention taking action based on those concerns. Thus, although African-Americans seem to be deeply concerned about environmental risk, but for some reasons, may be unwilling or *unable* (e g., due to financial or other constraints) to take steps to address these concerns (see Mohai, 1990).

## What Other Variables Could Explain Variation in Environmental Risk Concern?

A review of the literature generates several competing explanations for the relationship of race and ethnicity to concern about environmental risk. Some studies

argue that income or socioeconomic status is the driving force in the distribution of environmental inequities,[12] and, therefore, could explain minority risk perception or concerns about environmental risk. Other variables discussed as being important in explaining environmental concern and risk perception include age, gender, education level, and children. Studies find younger individuals (e g., Kanagy et al., 1994), women (Greenberg and Schneider, 1995; Davidson and Freudenberg, 1996), more educated people (e.g., Savage, 1993), and those who have children (Greenberg and Schneider, 1995) are more concerned about the environment.

At the end of each focus group session, the moderator distributed a participant form, and 385 individuals from 40 groups filled out this profile. This survey asked respondents demographic questions such as gender, age, income level, and number of children in the household that were under the age of 21. Other questions, such as whether the respondent considers he or she to an environmentalist or not, were also asked.

CERE did not include a direct measure of environmental concern about risk on the participant profile Thus, whether or not individuals considered themselves to be an "environmentalist" is employed as a proxy measure for environmental concern. One can reasonably assume that those considering themselves to be an "environmentalist" are implicitly aware of potential ecological risks and human health risks with an ecological origin. By using this logic, differences in the environmental attitudes among the racial and ethnic focus groups can be studied.

An ordered probit model allows for a multivariate approach that controls for other demographic variables in the examination of the influence of race and ethnicity This

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[12] See Been, 1994.

method has two direct benefits. First, it allows for a testing of hypotheses about other variables that are assumed to affect environmental concern. Second, it becomes possible to determine whether racial or ethnic status significantly effects the dependent variable, while controlling for variables suggested by competing hypotheses.

In Table 4-8, Environmental Concern (as measured by the question, "Do you consider yourself to be an environmentalist?") is regressed on several demographic variables including age, gender, and number of children in the respondent's household.[13]

The ordered probit models offer evidence that race and ethnicity matter in environmental concern, even when controlling for income, age, gender, children and site. Model 1 in Table 4-8 indicates that race and ethnicity--African-American, Asian-American, and white--are statistically significant in explaining if individuals consider themselves to be an environmentalist. African-Americans, Asian-Americans, and whites are more likely to be environmentalists than Latinos (the reference group).

Model 2 in Table 4-8 shows that gender (coded 1 for female, 0 for male) and age (respondent's age in years) achieve statistical significance. As expected, women are more likely to be environmentalists than men in the sample. Interestingly, although previous studies find younger individuals to be more concerned about the environment, in this study, older individuals are more likely to consider themselves environmentalists [14] Even including income in the model, Asian-American (p=.11) and African-American (p=.11)

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[13] For variable description and coding, see Appendix J.

[14] The author also included age squared in the model to test for a curvilinear relationship; this variable was not statistically significant.

Table 4.8: Environmental Concern Regressed on Demographic Variables Results of ordered probit model. Entries are coefficients with standard errors in parentheses.

| | I | II | III |
|---|---|---|---|
| African-American | 38130 (.20329)* | 33836 (.21515) | .59679 (.29815)** |
| Asian-American | 46630 (.23222)** | .38782 (.24369) | .64240 .28488** |
| White | .35212 (.17391)** | .16582 (.18976) | .30938 (.21691) |
| Income | | -.148 e-01 (.349 e-01) | -.162 e-01 (.429 e-01) |
| Age | | .774 e-02 (.446 e-02)* | .314 e-02 (.662 e-02) |
| Gender | | .21744 (.11878)* | - 114 e-01 (.1489) |
| Children | | -.457 e-01 (.474 e-01) | -0.145 e-01 (.55 e-01) |
| Hanford | | | -0.27541 (.33154) |
| INEL | | | .33263 (.29503) |
| Oak Ridge | | | .543 e-01 (.31016) |
| Rocky Flats | | | .38153 (.30607) |
| Fernald | | | .15860 (.27747) |
| Constant | 1.9128 (.21436) | 1.7595 (.32611) | 1.6242 .45919 |
| Log Likelihood | -492.6 | -452.9 | -324.7 |
| N*** = | 378 | 352 | 253 |

* p<=0.1
** p<0.5
*** All participants did not respond to all questions (for example, income).

barely drop below the standard cutoff of statistical significance (p=.10). As in Model 1, Asian-Americans and African-Americans are more likely to be self-classified "environmentalists" than Latinos (the reference group).

The results in Model 3 strongly supports the hypothesis that race and ethnicity are both important in explaining environmental concern. When controlling for site, gender, income, children, and age, Asian-American and African-American attain statistical significance (at the p=.05 level). Therefore, Asian-Americans and African-Americans are still more likely to be environmentalists than whites or Latinos (the reference group) even when controlling for age, gender, income, children, and site.

The most important findings from all three models, however, involved the variables income, race, and ethnicity. First and foremost, the results indicate that there are differences between ethnic and racial groups in respect to concern about the environment. Intuitively, those that are concerned about the environment will likely be concerned about environmental risk. Second, income is far from significant even when controlling for all other variables in the model. This provides important evidence to contradict the argument that environmentalism is not related to race and ethnicity, but is largely a socioeconomic phenomena. Even when controlling for income, both Asian-Americans and African-Americans are more likely to be more concerned about the environment than whites or Latinos. Thus, although differences among ethnic and racial groups could be related to economic factors other than ones available for this study (e.g , unemployment), income level is not the driving force behind how concerned ethnic and racial groups are about the environment.

## A Matter of Trust?

From the evidence presented, different racial and ethnic groups included in the survey clearly varied in their concern about the environment and environmental risk. One important and seldom explored explanation involves sources of information about these environmental hazards. Interestingly, when the respondents were asked about possible risks from the nuclear weapons facilities, many did not initially respond about their level of concern. Instead, their first reaction often included statements or expressions of frustration about their lack of information concerning the risks or their distrust of the risk information they had received. This comment from a white man in the Fernald downgradient group illustrates the interplay between concern about environmental risk and trust:

> Moderator: Are you aware of any other environmental problems that might be affecting plant life, or wildlife, fish?
>
> Man: I don't think they are not giving the whole story about Fernald, and that situation. In fact, I would think that I could go out on a limb and say that I think we are getting lied to about the situation. I mean strongly lied to. Because there is a definite problem . anybody with common sense knows that radiation in the ground, if you leave it there, it is going to affect something. They keep on telling you how, "No, it is not going to spread, or anything like that. " And I am just thinking to myself, "Where is the wool at? I am not a dummy." This is affecting something.

When asked about environmental problems, this man immediately contends that risk communications about Fernald do not include accurate information about the problems he and others face. He does not assess the environmental risks precisely because he feels that he is not getting enough truthful information to make a determination.

When the participants in the Latino group were asked how serious they thought waste problems were at Fernald, they also voiced concern about the truthfulness of the

risk communicators. One man stated, "I feel like our government--they don't tell us everything. The gentleman there, Mike, he mentioned about in the Service; I'm a Veteran, too. And there is a lot goes on that the Government don't tell what goes on."

As anticipated, this study appears to confirm a significant difference in concern about the severity and character of the risks in the environment among racial and ethnic groups. However, this alone does not illuminate the equally important matter of the impact that trust in sources of risk communication may have upon these perceptions nor does it reveal whether trust also varies across ethnic and racial groups as the previous interview might suggest. Although the relationship between risk perception and trust has been examined in previous studies, no studies trace these patterns across ethnic and racial groups. In the subsequent chapters, this relationship is examined.

## Summary

As expected, differences in concern about environmental risk exist among African-Americans, Asian-Americans, Latinos, and whites. African-Americans tend to have the greatest general concern about environmental risk while Latinos have the least. Whites and Asian-Americans are also concerned about environmental risk, but to a lesser degree than African-Americans. Whites and Asian-Americans tend to take action (e.g., buying bottled water, moving away from the perceived risk, etc.) related to their concern about environmental risk more than African-Americans and Latinos. Further, concern about the environment cannot be explained by income level. Rather, this study finds race and ethnicity--even when controlling for income, age, gender, children, and DOE site--to be powerful predictors of environmentalism.

## Conclusion

Psychological and, especially, social and cultural theories have long implied that variations in risk perceptions exist in the socially heterogeneous United States. The data from the focus studies, however, suggests that a disaggregation of the nonwhite group into its ethnic and racial components reveals new and important information about concern over environmental risks. Relatively few other empirical studies of risk perception or environmental attitudes among minority groups clarify differences among them in how concerned they are about environmental risk. Additionally, the content analysis and ordered probit models presented here indicate not only that differences definitely do exist between African-Americans, Asian-Americans, Latinos, and whites, but also that they cannot be explained by an intuitively appealing alternative theory involving socioeconomic status.

Several findings merit further discussion. First, African-Americans are most likely to register general concern over things like the effect of radiation. Second, whites and Asian-Americans both have significantly more mentions of action-related concern than either African-Americans or Latinos. In particular, the expression of concern linked to action is least prevalent among African-Americans--the group, paradoxically, most likely to mention a general concern. Although African-Americans seem to be deeply concerned about environmental risk, they may be unwilling or, perhaps, *unable* to address these concerns directly. This finding fits with the existing literature: Paul Mohai's 1990 study finds similar levels of environmental concern among whites and African-Americans, but

shows whites taking action based on their concerns (e g., recycling) to a greater degree than African-Americans.

Asian-Americans also modify their behavior on the basis of their assessments of environmental risk. As compared with other minority groups, many Asian-Americans tend to have higher incomes [15]. Thus, these individuals would seem better prepared to change their behavior (such as buying bottled water) based on their concerns. This could also result from higher education levels among some Asian-Americans when compared to other minorities.

Finally, Latinos were least likely to mention a general concern, personal concern, or action concern, and seemed most likely to express slight concern or none at all when compared to other groups studied. No current studies document differences among Latinos and other ethnic or racial groups nor suggest, as this study does, that Latinos are the least concerned about the environment and environmental hazards (see Tables 4-1 and 4-8). One possible explanation is that Latinos are less fatalistic about hazards and are more optimistic about the future than other minority groups (Turner and Kiecolt, 1984), but this argument does not explain differences between Latinos and whites. These differences may be due to other, as yet unexplored, culturally-oriented views (affected by such factors as religion or citizenship status) toward the environment.

Similarities also exist among the groups. The whites and Asian-Americans behave similarly. No more than 6 percentage points in any category ever separate these two groups. African-Americans and Latinos also are alike in many ways. With the exception

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[15] Although many Asian-Americans have higher incomes than other minorities, Asian poverty is higher than white poverty (Lee, 1994)

of the "slightly concerned" and "general concern" categories, these groups have similar patterns of risk perception. Possible explanations for these findings are discussed in subsequent chapters, but one probable explanation is the way different ethnic and racial groups are treated in American society. Specifically, Asian-Americans tend to be far more assimilated into the political process than either African-Americans or Latinos, and may respond to risk in similar ways as whites who are generally more assimilated in the political process.

Policymakers need to take into account these apparent differences among different audiences when communicating to the public about risk, especially because trust is an important variable affecting stakeholder risk perceptions and their opinions about the risk communicators (Slovic, 1993). If stakeholders do not trust those communicating information about risks, then policymakers will likely have greater difficulty addressing the concerns of these individuals or groups. Reestablishing trust through risk communication would seem to require a more precise understanding of the views of stakeholders. This is markedly true for minorities who, as evidenced by greater levels of exposure to environmental risks and concerns about environmental racism, have more substantive reasons for distrusting governing officials and institutions. Determining who these groups trust for information about environmental hazards is crucial in establishing responsible and effective risk communication, and is the focus of the next chapter.

# CHAPTER 5
# "WHO DO YOU TRUST?": CONFIDENCE IN RISK COMMUNICATORS

Moderator: You've given me some information on this, but I'll read the question. I need to ask you specifically what are your concerns, not just about the waste, but the clean up? If there's anything else that you have to tell me that really concerns you about the clean up at Rocky Flats.

Man: That it's going to be as badly mismanaged as everything else at Rocky Flats has been. And that we will continue to be lied to. (White Downgradient, Rocky Flats)

During the focus group interviews, some respondents from all groups mentioned that their uncertainty about the level of local environmental risk arose from a lack of information while others distrusted the information they did receive. In every focus group analyzed, the majority of participants voiced a desire for more relevant information about the site. Indeed, participants who were asked about their concerns related to the site repeatedly stated that they lacked enough solid information to venture an opinion.

Among those who did voice an opinion, several respondents assumed that site problems were more serious than the DOE or the site management maintained. Repeatedly, when asked about their perceptions of local environmental hazards, participants betrayed in various ways a reluctance to trust their information sources. Intuitively, one expects that risk perception is influenced by how risks are communicated and who communicates this information, but scholars have so far failed to address how

ethnicity and race may also influence the response to risk communications and risk communicators.

Popular perceptions that the government is overly secretive and intentionally deceptive may well force agencies to look more aggressively and frequently for potential partners to facilitate environmental risk communication.[1] To the extent this is successful, new groups will be brought into the policymaking process as facilitators helping to revitalize the democratic process. This chapter examines more closely the differences in public patterns of trust in government and other social institutions with particular attention to how these differ across ethnic and racial groups.

## Trust Is Crucial for Risk Communication and Policymaking

A lack of public confidence and widespread distrust in institutions has convinced policymakers to experiment with new approaches to incorporate public concerns in their policy decisions. These experiments reflect the idea that the relationship between government and the public should be one of collaborative decision-making; "communicating *with* rather than *to* the public is more likely to meet public expectations in the 1990s" (Bradbury, 1994, 363).[2] Without citizen input, many times government agencies find it markedly difficult to implement laws and, subsequently, litigation over

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[1] Partnerships between government and other sources of information have been formed in the past. For example, many federal agencies attempted to foster good relations with the media in order to communicate risks to the public. Federal agencies also work together The Environmental Protection Agency (EPA) and the Centers for Disease Control (CDC), for example, issue joint reports on the health risks of radon (Mason, 1989).

[2] Creighton traces the evolution of the relationship between citizens and government agencies: a procedural relationship marked the 1960s and 1970s. In the 1980s, the public desired more meaningful involvement. The 1990s' ideal is "collaborative decision-making" (Creighton cited in Bradbury, 1994).

agency decisions is often increased. For effective policymaking, agencies increasingly attempt to include citizen views in the development, implementation, and evaluation of policies.

Government risk communication programs require interaction between agencies and citizens (Klauenberg and Vermulen, 1994). It is the accepted wisdom among risk specialists that "implementing more participatory strategies to manage risk, including community-based management or environmental dispute settlement, will be possible only if . . . diverse communities and individuals can be engaged systematically as equal partners, despite significant differences in the broader social context of exposure to hazardous substances" (Vaughan, 1995a, 170). A new stress on public involvement is one attempt to redress falling levels of trust by encouraging greater public participation. Initiatives to include the public in risk management, such as those by the DOE, highlight the difficulties inherent in incorporating the views of diverse groups (Committee to Provide Interim Oversight of the DOE Nuclear Weapons Complex, 1989, 50). Yet including the public is especially important to the DOE given its acknowledged secretive history in communication risks to the public (U.S. Department of Energy, 1995).[3]

The cost of the environmental cleanup at all DOE sites is estimated as high as $1 trillion over 75 years (Veiluva, 1996) Because complete environmental restoration at the DOE sites considered in this study is unlikely to be economically feasible, public input is increasingly important in determining the priorities for any future cleanup (U.S. Department of Energy, 1995) Despite the need for a dialogue among government agencies, experts, and the public (Bradbury, 1994; Hadden, 1991; Slovic, 1987), one

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[3] See Chapter 1.

difficulty in communicating the public's viewpoint lies in the fact that public consensus about what is more or less risky rarely exists among a socially heterogeneous public. Even where there is evidence of substantial agreement (which many times reveals a tendency for policymakers to create artificial consensus), these cases seldom suggest how different groups *vary* in their concern about risk.

Certainly understanding the viewpoint of different groups and individuals is vital for effective policymaking and risk communication. To be effective, those responsible for communicating risk must at least comprehend the effect and the effectiveness of their messages on those receiving them. This chapter explores the increasingly important similarities and differences in group trust toward those individuals and institutions involved in risk communication. Two questions, in particular, need to be addressed. Do communities exposed to environmental hazards trust some sources for risk information more than others? And, do some groups give more credence to information from specific social institutions than do other groups within the same community?

## General Distrust

Not surprisingly, wariness and outright distrust of government and other social institutions appears in the focus groups. Amongst the general populace, confidence in elected officials and institutions has diminished in recent years. This is traced by public opinion polls and well-documented in the political science literature (Craig, 1993; Rudder,

1993, Lipset and Schneider, 1987) Peter G Brown asserts that "we are in the midst of a crisis of governmental legitimacy, of public faith in government" (Brown, 1994, xiii) [4]

Observers point to a steady decline in public confidence in all institutions.[5] The "decline in deference" towards institutions has lead to increased public participation in grassroots movements (Fowlkes and Miller cited in Hadden, 1991, 50) and has taken a variety of forms. The prevalence of the Not in My Backyard (NIMBY) syndrome--localized public opposition to the siting of hazardous waste facilities and other locally unwanted land uses (LULUs)--derives from the decrease in institutional trust. Such publicly demanded legislative initiatives as right-to-know laws also reflect this phenomenon.[6]

Thus, one expects individuals in the general population to manifest high levels of distrust in government and other social institutions. Participants in this study differ from the general population, however, in being even more likely to be distrustful because of their proximity to serious environmental hazards and their negative experiences with official secrecy, secrecy masking serious health risks for as long as 50 years at the majority of the sites. All the individuals in this study, regardless of race, would seem particularly

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[4] Some scholars view this distrust as not necessarily a negative reaction where "the public is now more competent and more knowledgeable, more capable of effective distrust. Distrust is this sense is not destructive. On the contrary, a certain amount of rational distrust is necessary for political accountability in a participatory democracy" (Barber, 1983, 166).

[5] Since 1966, the public's confidence in the medical and scientific community, the media, and Congress has generally declined. Confidence in major companies has increased only slightly (Poll cited in Hadden, 1991).

[6] The 1984 Community Right to Know Act, precipitated by the deaths of thousands in a chemical disaster in Bhopal, India, was approved despite concerns over the burden it would cause industries. This Act requires that all communities have the right to know about what kinds of emissions are being produced in their community.

likely to distrust the DOE, if not the government generally, because DOE representatives deliberately misled them in the past and so recently admitted to so doing publicly (U.S. Department of Energy, 1995).

One downwinder from the Fernald focus group stated: "They [the government] lied to us in the beginning. I think they hid it [risk from the sites] for a long time and so now its difficult for us to know whether what we're getting in the way of information is accurate or not." The DOE is well-aware of the "congressional, regulatory, and public concern and scrutiny" that resulted from this secrecy and its predecessor's (the Atomic Energy Commission and the Energy Research and Development Administration) secrecy about the probable risks to which the public was exposed. To address these concerns, the DOE *now* maintains that "its activities in environmental restoration and waste management must be open and openly communicated," but for 50 years the information about risks from the sites was not disseminated to the public (U.S. Department of Energy, 1992, 5).[7]

## Trust and Environmental Racism

Explanations for why African-Americans and other minority groups are exposed to more environmental threats than whites range from economic necessity to deliberate prejudice or environmental racism. Environmental justice is "concerned with the government's failure to adequately protect public health and the environment" for all peoples regardless of race or class (Israel, 1994, 471). The environmental justice movement (EJM)--an organization of minority groups at the national and local level--proclaims environmental racism to be a serious problem for their communities. What does

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[7] See Chapter 1.

the formulation of EJM organizations suggest about minority groups' confidence in government to address their concerns?

Historically, minorities struggled with government for equal treatment politically and legally The heritage of abuse and neglect, and the failure of the United States government to guarantee minorities their rights can be seen in myriad examples: the relegation of Native Americans to marginal lands, the disenfranchisement of African-Americans until the 1960s, the exclusion of Chinese immigrants in the 1880s to the 1920s, and the internment of Japanese-Americans during the Second World War. Environmental inequities exacerbate preexisting distrust caused by these struggles. Robert Bullard, one of the most important scholars studying issues of environmental equity, maintains that "[n]ot only are people of color differentially impacted by . . pollution, they can expect different treatment by the government" (Bullard cited in Israel, 1994, 471). Survey research documents that African-Americans have less trust in government than whites (Morin, 1997). Similar data for other minorities is scarce, but the researcher expects that trust in government would be less likely among these groups than among whites.

As reviewed earlier, risk perception theories suggest differences in risk perception or concern about environmental risk by race and ethnicity.[8] This study is concerned with how groups or institutions in which minorities *do* invest their trust affect their concern about environmental risk. It is not obvious that there is be a "carryover" of trust from the source to specific risk communication. Nor is it clear in the existing literature the degree of such transference One expects that minority groups will place their trust in different sources of information than whites because cultural and historical experiences such as

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[8] See Chapter 2.

racism affect group trust It is important to note that the whites in this study are more likely to be exposed to significant environmental hazards than the white population in the rest of the country; consequently, these white individuals are also more likely to be distrustful of risk communicators than the general population.

## Who Do You Trust?

During the course of the focus group protocol, moderators posed the following question to all 29 groups. "Who would you trust to give you accurate information about (Name site) and the activities at (Name site)?" The analyst determined who groups trusted from this question.[9] This open-ended question (one of the attractions of the focus group approach) again encourages the richness of response usually unavailable from traditional survey research.[10] Furthermore, this format makes it clear whether respondents understand trust in the same way. In not seeding answers (or preselecting categories) by specifying in advance the options for trust repositories, such as the media or specific groups, moderators permitted respondents to freely discuss whom they trusted. The

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[9] Trust is defined in several different ways and with various facets in both political science and risk communication literature (e.g., Renn and Levine, 1991; Brown, 1994). Brown's understanding of trust, based on Barber's, is most appropriate for consideration in this research because it encompasses the significance of performance and obligation. According to Barber, trust has a dual definition:

> One is the expectation of technically competent performance and the other is the expectation of fiduciary obligation and responsibility. These two kinds of trust are indispensable for the maintenance of social order and for the construction of relatively orderly social change. As individuals deal with one another, with organizations, and with institutions, and when organizations and institutions deal with one another, they count on both technically competent performance and on direct moral responsibility for their welfare (Barber, 1983, 165).

Brown argues that government should be a trustee capable of protecting the vulnerable to create political legitimacy His definition of trust is based on Barber's fiduciary responsibility.

[10] See Chapter 3

following exchange from an Asian-American group illustrates of how participants usually responded:

> Moderator: Who would you trust to given you accurate information about Rocky Flats and the activities going on there?
>
> Man: People that work there.
>
> Woman: The president of the company, if he was my best friend. Let me clarify that--if he were my husband.
>
> Man: Independent auditing firm that is an expert in that area. An independent that represented "the citizens" and does not have to answer directly to the government. I don't know it that's easily attainable

The moderator asked the groups to rank those sources mentioned from most trustworthy to least trustworthy [11] Although the respondents generally failed to situate these sources on a continuum, they did identify the sources they viewed as least or most trustworthy Table 5.1 tabulates the exchanges prompted by this trust question.[12]

In Table 5-1, the first column identifies different sources of expertise mentioned by the respondents: Governmental, Personal, Nongovernmental, and Industrial. Government sources include public health agencies (the Department of Health, the Environmental Protection Agency, and the Food and Drug Administration), the Department of Energy, other specific mentions of government (particular elected representatives), and nonspecific government (such as "politicians"). "Specific government" includes particular elected representatives, either mentioned by name or by office. "Nonspecific government" includes mention of "government" generally, local government, state government,

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[11] See Appendix C for the moderator's guide.

[12] The author conducted all coding Six of the 29 focus groups were chosen randomly and checked for reliability by two other individuals Coding for trust received a Percentage of Agreement Index (PAI) of 90.3%.

governmental agency, and "politicians." "Personal sources" are finding the information for themselves, friends, family, regular citizens, or local citizen groups. "Nongovernmental sources" are outsiders, experts, environmentalists, and the media. "Industrial sources" are management, employees, and subcontractors.

Table 5-1 reports the raw frequency of mentions as well as the percentage of total mentions per group (column percents). For example, African-Americans mention trust in citizen groups 4 times, 31% of their total mentions. Column percents allow comparisons across all ethnic and racial groups Although each group did not have the same number individuals as participants, each group was conducted for approximately the same amount of time (one and one-half to two hours).

Table 5-1 reveals variation in the trust repositories of the various ethnic and racial groups with respect to information about the six DOE sites: these variations exist not only between "whites" and "nonwhites," but also among different ethnic and racial groups. Several aspects of the table are particularly important. First, nongovernmental sources were the most frequently mentioned information sources followed by personal, industrial, and governmental sources. Second, African-Americans are distinguished by the lowest frequency of trust in *any* source when compared to all other groups. Finally, Asian-Americans have the highest number of mentions of trust across all groups.

Looking closely at the relationship of each group to possible sources of information reveals some interesting paradoxes. Subsequent tables derived from the information in Table 5-1 analyze the frequency of trust mentions by source. Qualitative content analysis enriches the description of group trust and is employed to analyze group responses to several additional questions.

Table 5-1: Mentions of Trustworthy Sources of Information About the DOE Sites: By Ethnic or Racial Group Column Percents (Col. %) in bold.

| | Whites [13 Groups 124 people] | | African-Americans [6 Groups 62 people] | | Asian-Americans [5 Groups 46 people] | | Latinos [5 Groups 51 people] | | All Groups [29 Groups 283 people] |
|---|---|---|---|---|---|---|---|---|---|
| | N | Col. %** | N | Col. % | N | Col. % | N | Col. % | |
| Public Health Agencies | 2 | **3** | ----- | ----- | 11 | **23** | 2 | **6** | 15 |
| DOE | ----- | ----- | ----- | ----- | 1 | **2** | ----- | ----- | 1 |
| Government-Specific | 8 | **11** | ----- | ----- | 1 | **2** | ----- | ----- | 9 |
| Government-Nonspecific | 1 | **1** | ----- | ----- | 2 | **4** | ----- | ---- | 3 |
| ***TOTAL: GOVERNMENTAL*** | 11 | **15** | ----- | ----- | 15 | **31** | 2 | **6** | 28 |
| Finding Own Information | 5 | **7** | 3 | **23** | 2 | **4** | **4** | **11** | 14 |
| Friend | 2 | **3** | ----- | ----- | 1 | **2** | ----- | ----- | 3 |
| Family | ----- | ----- | ----- | ----- | ----- | ----- | 1 | **3** | 1 |
| Citizens / Citizen Group | 3 | **4** | **4** | **31** | 5 | **10** | 1 | **3** | 13 |
| ***TOTAL: PERSONAL*** | 10 | **14** | 7 | **54** | 8 | **17** | 6 | **17** | 31 |
| Outsiders | 18 | **25** | 2 | **15** | 4 | **8** | 7 | **19** | 31 |
| Experts | 9 | **12** | 3 | **23** | 1 | **2** | 2 | **6** | 15 |
| Environmentalists | 6 | **8** | ----- | ----- | 2 | **4** | ---- | | 8 |
| Media | 12 | **16** | ----- | ----- | 4 | **8** | 10 | **28** | 26 |
| ***TOTAL: NON-GOVERNMENTAL*** | 45 | **62** | 5 | **38** | 11 | **23** | 19 | **53** | 80 |
| Management | ----- | ----- | ----- | ----- | 1 | **2** | 1 | **3** | 2 |
| Employees | 6 | **8** | 1 | **8** | 12 | **25** | 7 | **19** | 26 |
| Sub-contractors | 1 | **1** | ----- | ----- | 1 | **2** | 1 | **3** | 3 |
| ***TOTAL: INDUSTRIAL*** | 7 | **10** | 1 | **8** | 14 | **29** | 9 | **25** | 31 |
| **TOTALS** | 73 | | 13 | | 48 | | 36 | | 170 |

* In all focus groups analyzed here the following question was asked: "Who would you trust to give you accurate information about (Name site) and the activities at (Name site)?" Mentions were derived as a result of this question.

** Due to rounding error, column percent totals may not equal 100%.

## Trust in Government

Considering the very real environmental risks that the respondents faced as well as the government's prior secrecy about the sites, any mention of trust in government by residents near these sites is surprising. Survey research finds that citizens do not generally trust government or politicians, although there some evidence suggests citizens trust state governments more than the federal government (Morin, 1997). Still, overall levels of trust in government are low. Due to these findings and the DOE's prior history of misinforming local citizens about risks near the sites, the researcher expected that the participants in this study would express limited trust--if any--in government. In particular, minorities should be even less likely to trust government and its institutions because of its historically antagonistic relationship with them.

Table 5-2 summarizes the findings of this study concerning mentions of trust in government. As expected, citizens do not overwhelmingly mention government as a trustworthy source for risk communication about the sites. But looking at the differences across ethnic and racial groups and within categories of government, interesting patterns emerge.

Generally, respondents felt that government, however represented, was not trustworthy. When participants discussed the government, it was in relatively negative terms. From a Type A group, one Rocky Flats Native American woman's statement illustrates towards government held by many of the participants.

Table 5-2: Relative Frequency of Mentions of Trustworthy Government Sources of Information About the DOE Sites By Ethnic or Racial Group

| | Whites [13 groups 124 people] | African-Americans [6 groups 62 people] | Asian-Americans [5 groups 46 people] | Latinos [5 groups 51 people] |
|---|---|---|---|---|
| Public Health Agencies (EPA, DH, FDA) | Infrequent* | ----- | Frequent | Infrequent |
| DOE | ----- | ----- | Frequent | ----- |
| Government (Specific) | Frequent | ----- | Infrequent | ----- |
| Government (Nonspecific) | Infrequent | ----- | Frequent | ----- |
| **Total: Trust in Governmental Sources** | **Infrequent** | ----- | **Frequent** | **Infrequent** |

* Frequent = Greater than 25% Above the Mean Number of Mentions Across All Groups
Infrequent = No More than 25% Above the Mean Number of Mentions Across All Groups
----- = No Mentions

> My concern is that here is a lot more going on than we are going to ever be told. It's always said that everything is so hushed up, everything is so quiet, so secretive. We are always being--certain people that do the research and go in there and get the information. Somehow that information never gets out into the public and I don't trust the Federal government. I think that money is more important than people and I think that my concern is that there is something so dangerous there that--let's say if there was some kind of nuclear war. If they wanted to really wipe us out, that's the first place they would send a missile is to that area because they know there is a lot of plutonium storage there. Then we're all wiped out. Not only us as human beings, but the earth--mother earth. How can it come back from something that traumatic?

As improbable as this respondent's conclusions might seem, it still bespeaks categoric distrust of public institutions. Indeed, several other respondents maintained that the government is not honest with the public, and that government places its agenda--covert or overt--as more important than citizens' well being. When the government was discussed generally, most respondents expressed no trust in these sources. Most striking is that there is not one mention of trust in any level of

government--federal, state, or local--among any of the six African-American groups. The only minority group that showed a significant level of governmental confidence was the Asian-Americans. The following exchange from the Rocky Flats Asian-American group is illustrative

| | |
|---|---|
| Moderator: | I'm working on it. Who would you trust? |
| Woman. | You tell us |
| Woman: | I don't know. I don't even trust the head person over there to give me that information |
| Man: | Well, it would depend on the kind of environment protections of the citizen's groups. In the 70's and early 80's, there were so many demonstrations and arrests in that area, most of the young generations, college students, etc. Greenpeace and some of those organizations. Now though, we look into because the issue is brought up and the State Department of Health already involved and our Congressman or woman already involved and high levels of industrials, Department of Energy and contractors already got into there. So, with the high levels that are handling it, we are out of it. To me, I would trust them. They were handling the problem. |

Asian-Americans seemed, surprisingly, more willing to trust the government to deal with environmental restoration than even the white groups of this study. One explanation could be that some Asian-Americans are more likely to defer to traditional institutions.

From the public opinion data and previous literature, one would expect that African-Americans would have significantly *less* trust in government than whites (e.g., Morin, 1997), and this is the case. Further, African-Americans did not express confidence in any agency, elected representative, or local government. However, whites and Latinos voiced some trust in government, and Asian-Americans overwhelmingly--in comparison to other groups--mention government as the source they would consider trusting. Given

general citizen distrust of government, other possible sources of risk communication were examined, recognizing that the government's central role in environmental regulation means it cannot be totally removed from risk communication. Still other individuals or institutions might be useful partners in more effectively addressing critical communications of risk?

## Trust in Personal Sources

Intuitively, one supposes that personal sources of information should be the most highly trusted of all those considered here. Respondents did unequivocally trust personal sources for risk information about the sites; participants did not voice any negative reactions similar to those about government when group members mentioned personal sources. Table 5-3 reports the frequency of comments about personal trust across all groups.

Table 5-3: Relative Frequency of Mentions of Trustworthy Personal Sources of Information about the Doe Sites by Ethnic or Racial Group

| | Whites [13 groups 124 people] | African-Americans [6 groups 62 people] | Asian-Americans [5 groups 46 people] | Latinos [5 groups 51 people] |
|---|---|---|---|---|
| Finding Own Information | Infrequent* | Infrequent | Infrequent | Frequent |
| Friend | Frequent | ----- | Frequent | ----- |
| Family | ----- | ----- | ----- | Frequent |
| Citizens / Citizen Groups | Infrequent | Frequent | Frequent | ----- |
| **Total: Trust Personal Sources** | **Infrequent** | **Infrequent** | **Frequent** | **Infrequent** |

* Frequent = Greater than 25% Above the Mean Number of Mentions Across All Groups
Infrequent = No More than 25% Above the Mean Number of Mentions Across All Groups
----- = No Mentions

Some respondents contended that they could only trust themselves to find their own information. In comparison with other racial and ethnic groups, Latinos most often relied on themselves for information about the sites. One Latino respondent from Hanford replied to a question about the information sources he trusted:

> I guess the library. That's where I would go. If I wanted to get some real information, because there I would then have the capability of picking and choosing from different sources. Okay? I don't trust the newspapers because they have a slant for themselves, the television media has the same type of situation and the government definitely has their own agenda as well as the management of the facility, they have their own agenda. Then you have the other aspects of the environmentalists, okay, and they put their own slants, you know, so you have to stay very informed with what is going on or else you end up believing things that could or could not be true. You have to be able to make your own judgment on a lot of stuff.

This respondent distrusts the media, government, facility management, and environmentalists: he prefers to let the individual gather information from many different sources and then use his own judgment to assess the risks. This individual believes that he can gain enough information at the library to assess risks, when most participants maintain that they do not have enough information or even access to make judgments.

Overwhelmingly, respondents claimed that they would trust individuals they know for information about the site. Acquaintances, friends, or family members with occupation-related access to the site would be considered to be reliable sources of information. One Asian-American who dwelt near the Savannah River site enumerates the people whom he trusted.

Moderator: Who would you trust, John?

Man: Oh, I'd trust the people I know. I have five neighbors, two friends, and three in-laws that are either employed out there now, or they have been employed out there. And I alluded to their safety record

> out there. I know of an electrician, he was released because he was climbing across some pipes and he got just a little bit on his behind, you know, from climbing on those pipes, and they had to let him go. And I firmly believe they do monitor everybody.

John's clearly places his greatest trust with neighbors, friends, and family. Listening to their experiences, John constructed his own assessment of the site's management.

Others, however, do not share this confidence in others to inform them about what is going on at the sites. Several participants in the African-American groups thought that there was a lot of cover-up at the sites. It was the assessment of participants in the Hanford African-American focus group that government will not provide reliable information.

Moderator: Who do we trust then? Who do we trust?

Man: I don't think it's reliable. I think it's a lot of covering-up, and stuff like that, you know. Anytime you get anything that big involved in the government, they're just, like--whatever we look in the paper where they experiment on some guy, put radiation in him in 19-so-and-so, covered it up all these years, or whatever. And you got to think this type of thing is going on about the cleanup, about what's out there, or what's really going--who's really getting radiated, seepage, and everything. I just think there's a lot of stuff covered up.

Moderator: So who do we trust?

Woman: We have to make our own minds up.

Man: Right on.

Apparently, this high level of distrust of other sources results in trusting only one's self. While several participants in the study mentioned that the government could be covering up the dangers at the sites, this idea circulated most frequently among African-American, Native American, and Latino groups.

Many participants agreed that "regular" citizens who lived near the site or, more significantly, citizen groups would be trustworthy sources. Every ethnic or racial group except Latinos mentioned trust in these sources at least once; citizen groups were the only one with an apparently universal ability (Latinos did not mention distrusting these sources) to demand credibility, thus making these sources an obvious ally for government agencies interested in enhancing credibility. The prevalent feeling was that local citizens would have the same vested interest as others living in the area; hence, they were trustworthy.

Some Latino respondents believed that getting personally involved in gaining information about the sites was a moral necessity if an individual lived nearby.

> Moderator: How about the rest of you? Who would you trust to give you information about Fernald?
>
> Woman: What about those neighbors who live around the Plant, all those could stop complaining and start--maybe they could get involved and make sure they are doing what they are supposed to.

This Latino woman from the Fernald group expressed the idea that those effected cannot just complain, instead they need to get involved.

In sum, respondents, and especially the nonwhite individuals, clearly consider personal sources trustworthy. Agency officials "going from door to door" to communicate risks to affected individuals would be effective, but from a practical standpoint, risk communication would be difficult for governmental agencies to efficiently perform these communications on a one-to-one basis with these respondents. All ethnic and racial groups except Latinos mentioned citizens and citizen groups as trustworthy sources of information. Citizens groups, often locally formed on an *ad hoc* basis, generally comprise individuals familiar with the concerns of their community. Seldom,

however, do citizen groups in fact contain members with sufficient scientific expertise to understand, summarize, and communicate technical data surrounding concerning environmental risk. Thus, such nongovernmental sources as scientific experts, the media, and environmentalists would seem more likely to be crucial partners in governmental efforts to better communicate risks to citizens.

Trust in Nongovernmental Sources

Table 5-4 Relative Frequency of Mentions of Trustworthy Nongovernmental Sources of Information About the DOE Sites By Ethnic or Racial Group

| | Whites [13 groups 124 people] | African-Americans [6 groups 62 people] | Asian-Americans [5 groups 46 people] | Latinos [5 groups 51 people] |
|---|---|---|---|---|
| Outsiders | Frequent* | Infrequent | Infrequent | Frequent |
| Experts | Frequent | Infrequent | Infrequent | Infrequent |
| Environ-mentalists | Frequent | ----- | Frequent | ----- |
| Media | Infrequent | ----- | Infrequent | Frequent |
| **Trust Non-governmental Sources** | **Frequent** | **Infrequent** | **Infrequent** | **Frequent** |

* Frequent = Greater than 25% Above the Mean Number of Mentions Across All Groups
Infrequent = No More than 25% Above the Mean Number of Mentions Across All Groups
----- = No Mentions

Several participants thought nongovernmental sources to be trustworthy to about information regarding risks associated with the sites. Table 5-4 reports the frequency of such statements of such trust across all groups. Whites and Latinos mention nongovernmental sources more than other racial or ethnic groups, but only whites and Asian-Americans include environmentalists among such sources. One Asian-American

woman living near the Savannah River Site explains why she could trust environmentalists.

> Moderator: Who would you believe? [ for information about the site or risks there]
>
> Woman: I'd say that you need to get some environmentalists out there to go on a tour, and inspect, 'cause they'll know what to look for. Just like you have a health department that goes through a restaurant; you don't want somebody that works there at the restaurant to tell you their goods and their bads. You want somebody from the outside.

Asian-Americans and whites believed environmentalists to be capable of truthfully communicating risks. Both Asian-Americans and whites tended to view these sources as unbiased--they could, in effect, be "honest outsiders." The absence of such mention by Latinos and African-Americans is also significant since these ethnic and racial groups are strongly represented in the Environmental Justice Movement, a grassroots movement formed because mainstream environmentalists were not addressing these groups' concerns. Still, only white and Asian-American participants mentioned environmental organizations, such as Greenpeace or the Sierra Club, by name as sources that they considered to be reliable.

Outsiders are mentioned by all groups, but most frequently by whites and Latinos. Generally, when participants talked about "outsiders" they were discussed in generic terms, although some respondents pinpointed unlikely outsiders, such as Carl Sagan or the Pope (both mentioned by one white woman from the Rocky Flats Downgradient group), as trustworthy sources. An exchange among Latinos from Fernald illustrates why outsiders would be considered appropriate sources

Moderator: Again, and this more than anything, what would we like to know is, if you were to receive information, who would you trust personally to tell you? Who or what would you trust as an information source?

Man: I'd probably trust the most radical of all organizations for pointing fingers and it would probably be like the EPA on this issue, probably the EPA

Man: Either that or an independent board of some kind--

Man: Out of the area--

Man: Who wouldn't have ties, necessarily, sort-of like an independent prosecutor.

Man: Right, 'cause any Government agency involved with that would be in the "I'm sorry" mode to the community and then anything from the community is "do you owe me" scenario. So, both those information sources are out. The community is job-based. You take that away, you take their jobs. The Government is singing Connie Stevens, "I'm sorry." We protected American, but we don't need it anymore and we're sorry

These Latino individuals desired an independent board or prosecutor. They argued that such sources would be the most trustworthy because economic and other concerns made it impossible for either the government or the community to have each citizens' best interest at heart.

Another aspect of the trust issue involves group perceptions about the motives for sources to report risk information to the public. Different groups assigned credible motives to different sources of information. Whites believed that the media, no matter the motive, accessed information and constituted a potentially reliable information source. An exchange from the Rocky Flats Downwinder group illustrates a regard for the media as well as the importance to the respondents of accessing information.

Moderator: Well, who would be a trustworthy source?

Man: I think the only thing you can trust, and I'll probably get booed for this, is the media, especially newspapers, because they don't have any--or, they may have an ax to grind, or they may not, but they don't--if--they're not a government commission that automatically does have something, even if it's elective, it's still possible it goes that way. So they just have to have access.

Moderator: John?

Woman: I think the problem with--if you look to the media as being the central, you have a--run the risk of having the media go out and talk to disgruntled employees that used to work there, and having somebody run off with what they thought was an exclusive story. It's just some guy that's mad at his boss who's still working there.

Man: Yeah.

Man: And he's telling all these great stories about how everybody is handling plutonium with their bare hands, and you know, that's the word I would have with the media.

Man: It was the media that got the report from the other place, though, from the arsenal, from other than the Freedom of Information Act. But it took two years in court battles, and that wasn't near as secret.

Man: Right.

Woman: Right.

Man: Right.

Man: Two years of fighting to get it, you know.

Woman: You know, I mean, I agree with John. I think that it would probably scare us right out of the metro area if we really knew what was going on there. But I think at some point people, you know, people at least have the right to know, to make some informed decision, you know, "Do I want to buy a house next to this particular neighborhood?" You know, "Do I want to drink the water?" "Do I want to plant a garden?" Those are the kinds of things, you know, I believe that people do have that right to know. And I think that, you know, to hopefully, maybe never make this kind of mistake, if you want to call it that, you know, to know as much as we can know, to learn from the mistakes as much as we

> can. Not just the government entity, the Department of Energy, but all of us, you know, so that something like this, you know, we don't end up with another Rocky Flats of some sort, in another form, in another state in a hundred years.

From their experience at Rocky Flats, these individuals view the media as capable in facilitating what one woman considers a citizen's right to know.[13]

Trust in Industry

In 1994, the agenda of the newly-elected Republican congress included a reduction of environmental regulations on industry. When the focus groups were conducted, some of the respondents voiced concern about deregulation of industry and decreased funding for enforcement of these regulations and environmental clean-up. One man from the Latino group assessed the environmental cleanup at Rocky Flats: "The Republican Congress [is] slowing down the monies to clean it [Rocky Flats] up, which [means it] is going to take a lot longer to clean up." Because of this political climate and the prior misrepresentation of risks from the by site management (the DOE contracts management for each of its sites),[14] the researcher expected that citizens living near the sites would seldom consider industry a trustworthy source of environmental information. As expected, respondents in most groups felt that management itself was untrustworthy because of its perceived concern with profits and desire to avoid responsibility for any risks to the public. The respondents from the INEL Latino group explain why they view corporate concern about risk liability or responsibility as an obstacle to truthful communication about risk.

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[13] The DOE at Rocky Flats, in particular, clearly lied to the public about the activities of the nuclear weapons facility there (see Chapter 1).

[14] See Chapter 1.

Moderator: So, as far as information coming to you and the activities there, I have heard, there are well, the common worker there. And I have NOT heard management, and a lot of laughs and heads shaking YES, that's right. Any other sources? Who would you trust?

Man: Probably, like I said, the subcontractors. The people who really don't have a whole lot to lose by giving, you know, out the information.

Moderator: And, what do you mean by not having a whole lot to lose?

Man: Well, if there was a big mistake, like if INEL pulled a big Boo Boo, and Lockheed is like, wait a minute, what is going to be our liability here, we can't disseminate this information. We can't give up.

Moderator: So someone who isn't liable then?

Man: Yes. Someone who is not liable. I think they are going to be more apt to be honest about it and say hey this is exactly what's happening and we are not pointing fingers, but this is what happened.

In a similar vein, a majority of all respondents believed those legally liable for damages or whose self-interest otherwise would be to cover-up risks imposed on the public were untrustworthy sources. Yet there was at least one significant exception to this industry stigma: all ethnic and racial groups cited employees (scientists or workers not management) at the sites as potentially trustworthy sources.

Table 5-5 reports the frequency of remarks about trustworthy industrial sources of information at the DOE sites by ethnic or racial group. Strikingly, Asian-Americans and Latinos often mentioned trusting industrial sources. While whites and African-Africans never mentioned trust in management, both Asian-Americans and Latinos expressed trust in this source. All racial and ethnic groups included individuals mentioning employees, but Asian-Americans and Latinos mentioned these sources most often. When Latinos and Asian-Americans mentioned employees at the site facilities as potential information

sources, they often qualified this by stating that they needed to know the individuals, a confluence of personal and industrial categories indicating that industry may be receiving an artificially high reading.[15] As stated earlier, individuals from all the nonwhite groups represented here tend to be disproportionately exposed to occupational environmental risks. Both Latinos and Asian-Americans may know employees at the sites in which they place their trust. Further, these groups could be dependent on the economic benefits stemming from the site (e.g., employment, etc.) which could encourage them to accept or ignore risks from the site.

Table 5-5: Relative Frequency of Mentions of Trustworthy Industrial Sources of Information About the DOE Sites By Ethnic or Racial Group

| | Whites [13 groups 124 people] | African-Americans [6 groups 62 people] | Asian-Americans [5 groups 46 people] | Latinos [5 groups 51 people] |
|---|---|---|---|---|
| Management | -----* | ----- | Frequent | Frequent |
| Employees | Infrequent | Infrequent | Frequent | Frequent |
| Subcontractors | Infrequent | ----- | Frequent | Frequent |
| **Total: Trust in Industry** | **Infrequent** | **Infrequent** | **Frequent** | **Frequent** |

* Frequent = Greater than 25% Above the Mean Number of Mentions Across All Groups
Infrequent = No More than 25% Above the Mean Number of Mentions Across All Groups
----- = No Mentions

## Trusting No One

When asked which individuals they would trust for information about the risks from the sites, some participants responded that they trusted no one. Although this

[15] Respondents rarely directly stated that they must know the individual who works there (2 times total in all groups), but several times other statements during the interviews implied that respondents would trust those employees at the sites they know.

corresponds with survey data documenting general citizen distrust, the ethnic or racial groups most often failing to trust any information source were African-American. Table 5-6 reports total distrust by racial or ethnic group.

Table 5-6: Relative Frequency of Mentions of Trusting No One for Information about the Doe Sites by Ethnic or Racial Group[16]

| | Whites [13 groups 124 people] | African-Americans [6 groups 62 people] | Asian-Americans [5 groups 46 people] | Latinos [5 groups 51 people] |
|---|---|---|---|---|
| Trust No One | Infrequent* | Frequent | Infrequent | ----- |

* Frequent = Greater than 25% Above the Mean Number of Mentions Across All Groups
Infrequent = No More than 25% Above the Mean Number of Mentions Across All Groups
----- = No Mentions

A discussion from the Hanford African-American focus group illustrates this categoric distrust. The participants in this group maintain that past experience taught them that they cannot trust risk communicators, and that self-interest shapes the information that does get passed along.

Moderator: So there's no one right now that you would trust to give you information?

Woman: We don't know of anybody that, you know, has done it in the past, and it would be truly a new adventure for them.

Man: One thing--

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[16] The actual number of mentions by ethnic or racial group are as follows:

| | |
|---|---|
| Whites | 5 |
| African-Americans | 6 |
| Asian-Americans | 3 |
| Latinos | 0 |

Woman: Yeah, and I know that money talks, and a lot of people do have, you know--you may see the ones who--some environmentalist and concern, and it's like--there's a lot of people who are environmentalists who are employed by the federal government which the DOE is also part of the government, so they can blow a little whistle, but they're not going to say too much because that's who's giving them their bread and butter, you know, it's all about the dollar It really is.

Moreover, other comments from other African-American focus groups indicate that experience drives this characteristic suspicion of all potential information sources.[17] One respondent's observation that no one has communicated truthful information in the past is supported by specific statements that she would not trust the federal government, the DOE ("part of the government"), or environmentalists ("who are employed by the federal government"). She sees self-interest, in this case economic self-interest inhibiting the flow of valid information about risks. This woman from Hanford views even nongovernmental groups, like environmentalists, as being controlled by the federal government--which is incapable of having its citizens' interests at heart. The association of environmentalists with the government may indicate the environmental movement's failure to reach out to populations other than the white middle-class.

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[17] Similar sentiments can be seen in this exchange, also from the Hanford African-American group.

Moderator: So there's just nobody. You don't trust anyone?
Woman Well, sometimes it just get sensationalized. Somebody maybe doing that for a purpose to get something brought in there, or get some different, you know, business do a lot of things, and they can put out a lot of propaganda, which I'm not saying everything that they're saying is wrong, but they can put out propaganda that make some other company look bad, where that they could work with the Chamber of Commerce and get their company in.
Moderator: So you still can't trust them?
Woman: Right.

## Summary

The evidence presented here suggests significant variation in patterns of trust across ethnic and racial groups With the notable exception of Asian-Americans, trust in government was low or nonexistent in all of the groups Trust in nongovernmental sources was variable: while whites and Asian-Americans expressed a willingness to trust environmentalists for information about the sites, Latinos trusted the media to communicate that information. Site employees represented a possible source of reliable information for Latinos and Asian-Americans Personal sources were trusted by all groups; this fact suggests that citizen groups may be the most effective medium for governmental agencies to convey information about environmental and public health risks.

## Conclusion

At present, as survey research demonstrates, few Americans trust government. Studies of environmental racism generally argue that the disproportionate exposure of minority populations to environmental risks exacerbate their already strong distrust of government and other social institutions. Grassroots organizations, like the EJM, independent of the environmental movement, reflect this distrust. Responding to concerns voiced by EJM groups as well as mainstream environmental organizations, government agencies strive to be more inclusive in setting environmental priorities and risk management. Trust is crucial for effective policy and risk communications (Covello et al., 1989).

In this study, distinct ethnic and racial groups have vastly different views about who they would trust for risk communications. The most striking comparison is between

African-Americans and Asian-Americans. African-Americans are the least willing to trust all potential risk information sources; Asian-Americans the most likely to do so.[18] In particular, the comparison among these minority groups is starkest concerning government. One might expect minorities to be even less likely to trust government and its institutions because of its historically antagonistic relationship with them, but Asian-Americans--differing from African-Americans and Latinos--trust government and its agencies even more than whites.

In this study, African-Americans consider only sources that are outside the traditional political process to be potentially trustworthy sources of risk information. Given this fact, the only way for government to effectively reach this group is through partnerships with citizen groups or "honest outsiders." In comparison, Asian-Americans seem willing to trust traditional institutions--and in particular public health agencies--to truthfully communicate information about risks.

One explanation for Asian-Americans' willingness to trust potential sources of risk information appears to be culturally related. Some aspects of Asian-American culture include deferential norms--seen in the respectful treatment of older family members--that may extend to government institutions.[19] Risk communication scholars provide few--if any--explanations for why Asian-Americans might place more trust in risk communication sources, but the present author argues that culturally conditioned respect for authority

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[18] Asian-Americans had 9.6 mentions of trustworthy sources per group as compared with Latinos (7.6), whites (5.6), and African-Americans (2.2).

[19] The author is well-aware that Asian-American culture varies by country of origin. For example, Japanese and Chinese cultures are markedly different. Deferential norms seem to be one aspect of Asian-American culture that cuts across ethnic lines.

and institutions leads many Asian-Americans to have substantially higher consideration for such sources than do other groups.[20]

Government and its agencies need to devise risk communication strategies for different audiences. As the comparison between African-Americans and Asian-Americans indicates, audiences from different ethnic and racial groups vary in their trust of government and other potential sources of information about risk. Effective communication between public authorities and citizens requires attention to the appropriate broker in risk communication. In a broader vein, if these ethnic or racial groups trust particular sources for risk information, they would likely trust these same sources for other types of information that government needs to communicate to its citizens.

[20] See Chapter 6.

# CHAPTER 6
# ETHNIC AND RACIAL VARIATION IN CONCERN ABOUT ENVIRONMENTAL RISK AND GROUP REPOSITORIES OF TRUST: TOWARD A WORLDVIEW EXPLANATION

> *The only thing is that we want more for the Hispanic community. It doesn't matter where we are from, we are all Hispanic. We don't want more discrimination. We don't want too much talk, we don't want to be discriminated, it's not fair, we are discriminated for just about every little thing.* [Italics indicate translation from Spanish.] ("Rafael," INEL Latino Group)

People's ways of viewing and coping with the world manifest themselves in the decisions that they make about where to place their trust. Different experiences lead people to different repositories of trust. Researchers cannot assess the impact of every influence on each individual's level of concern about environmental risk and their perceptions of who is trustworthy to communicate those risks; however, aggregate experiences can be studied. Collectively shared experiences may cause individuals within one group to fashion different trust repositories than those fashioned by people outside that group. Understanding that trust or its absence can be rooted in an individual's cultural heritage sheds light on how to build or rebuild trust between institutions and individuals. Chapter 4 demonstrates that concerns about environmental risk vary among distinct ethnic and racial groups. Chapter 5 indicates that the various ethnic and religious groups under consideration do not trust the same entities for information about environmental risk. The present chapter examines the relationship between trust and concern about environmental risk across distinct ethnic and racial groups. Cultural theory

can partially illuminate this relationship but to understand trust variation by ethnic and racial category, more specific factors must be addressed. These factors include: perceptions of racism and discrimination, economic dependence, and the homogeneity of group experiences.

## Cultural Theory: Predicting the Relationship Between Concern About Environmental Risk and Trust in Risk Communicators

On the basis of several theories explaining risk perception as well as empirical findings from survey research, one might expect to find a relationship between risk and trust (Slovic, 1993). Of particular relevance for explaining the relationship between risk and trust, Douglas and Wildavsky's (1982) theory--further elaborated on by Wildavsky and Drake (1990)--considers societal and cultural variables to be central to an individual's perception of risk. According to Douglas and Wildavsky, people select the risks with which they will concern themselves to protect threatened values and beliefs. Individuals focus on particular risks, not to just to safeguard health, safety, or the environment, but rather to buttress their society's beliefs about morality, social institutions, and nature (Covello and Johnson, 1987, viii). Individuals amplify or minimize risks according to these societal beliefs.[1]

According to this theory, individuals' views on risk vary because each person's unique social relations and cultural biases construct his or her risk awareness. To the extent that individuals share experiences and cultural values, their risk perceptions may be congruent. Based on Douglas and Wildavsky's theory, these risk perceptions are also important in patterns of trust. Individuals who perceive the environment to be fragile and

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[1] See Chapter 2's discussion of the cultural lens in risk perception.

the hazards associated with technology to be substantial (and its benefits minuscule) tend to trust citizen groups and other nongovernmental organizations while distrusting hierarchical, traditional institutions such as government and industry. Conversely, individuals who think technological benefits outweigh their total costs tend not to trust nongovernmental groups, likely preferring to trust traditional institutions instead (Peters et al., 1997). Thus, heightened concerns about environmental risks should be expected to lead people to trust traditional institutions less while trusting citizen groups and other nongovernmental sources of information more.

A 1997 study testifies to the operation of such a relationship (Peters et al., 1997). Employing survey research, Richard G. Peters, Vincent T. Covello, and David B. McCallum predict that a respondent's level of concern about environmental risk would relate positively to the trust afforded to, and perceived credibility of, citizen groups. They also predict that a respondent's concern about environmental health risk negatively relates to his or her trust in government and industry. The authors produced moderate support for their predictions. Although data support the projected relationship between risk perception and trust in government and industry, the relationship between an individual's level of concern about environmental health risks and trust in citizen groups was not statistically significant. The most significant relationship in the study was between level of concern and trust in industry: individuals with low concern about environmental risk afforded industry higher levels of trust.

Using Douglas and Wildavsky's cultural theory and findings based on this theory, the following hypothesis can be generated:

$H_1$ Individuals with higher than average concern about environmental risk will tend to have lower than average levels of trust in traditional institutions responsible for communicating risk.

This hypothesis implies a corollary predicting the inverse relationship.

$H_2$ Those individuals with lower than average concern about environmental risk will tend to have the higher levels of trust in traditional institutions responsible for communicating risk.

Figure 6-1 graphs these hypotheses as they pertain to the environmental risks from the nuclear weapons facilities and trust in government to communicate those risks honestly. As concern about environmental risk increases, trust in government, the institution most responsible for the communication of risk at the DOE sites, decreases. The inverse of this relationship--as environmental risk concern decreases, trust in government increases--will also be the case. Figure 6-2 graphs the relationship between environmental risk concern and nongovernmental institutions (those not directly responsible for communicating risk). This relationship is expected to be the inverse of the relationship between environmental risk concern and trust in government.

## Cultural Variation in the Relationship Between Concern About Environmental Risk and Trust in Government and Other Social Institutions

Can Douglas and Wildavsky's cultural theory predict--by ethnic and racial group--a relationship between environmental risk concern and trust in government and other social institutions? For the majority of groups studied here, Douglas and Wildavsky's cultural theory does not *thoroughly* predict this relationship. In the preceding chapters, Table 4-1 displayed concern about environmental risk and Table 5-1 charted ethnic or racial groups' trust in sources of risk information about the DOE sites. Although statistical associations cannot be estimated with these data, cognitive associations are clear

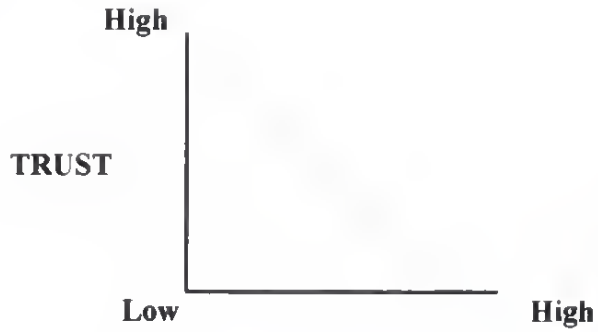


Figure 6-1: Predicted Relationship Between Concern About Environmental Risk and Trust in Government Sources of Risk Communications

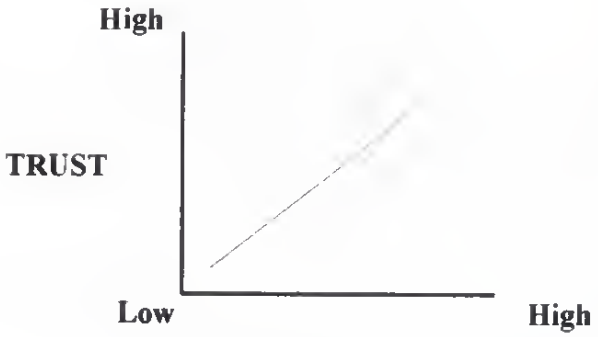


Figure 6-2: Predicted Relationship Between Concern About Environmental Risk and Trust in Nongovernment Sources of Risk Communications

in many responses. In this chapter, Tables 6-1 through 6-4 provide summary data from the earlier tables.

Concern About Environmental Risk and Trust in Governmental Sources of Risk Information

Predicted Relationship 1: Individuals having higher than average concern about environmental risk will tend to have lower than average levels of trust in government to truthfully communicate risk.

Corollary Relationship 1: Individuals having lower than average concern about environmental risk will tend to have higher than average levels of trust in government to truthfully communicate risk.

Table 6-1 reports the raw number of mentions and the percentage of total mentions of general concern about environmental risk and expressions of trust in government sources of information. As discussed in Chapter 5, "General concern" is concern about environmental risks such as contaminated water without qualifiers (e.g., that the water has become cleaner, etc.).[2] Trust in government sources includes trust afforded to public health agencies, the DOE, specific government, and nonspecific government.

Predicted Relationship 1 only clearly holds for African-Americans: the group with the most general concern about environmental risk has the least trust in government. The model did less well anticipating the responses of whites. Whites, while having relatively high levels of general concern about environmental risk, place greater trust in government than do African-Americans or Latinos. Asian-Americans, with higher levels of trust in government than any other group, also have a relatively high level of risk perception.

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[2] See Appendix G for a complete description of these categories.

Table 6-1: Mentions of Concern About Environmental Risk and Trust in Governmental Sources of Risk Information By Ethnic or Racial Group

| | Whites [13 groups 124 people] | | African-Americans [6 groups 62 people] | | Asian-Americans [5 groups 46 people] | | Latinos [5 groups 51 people] | |
|---|---|---|---|---|---|---|---|---|
| | N* | % ** | N | % | N | % | N | % |
| General Concern About Environmental Risk | 532 | **46** | 293 | **54** | 191 | **40** | 131 | **29** |
| Total Number of Mentions About Environmental Risk | 1143 | | 542 | | 474 | | 451 | |
| Trust in Governmental Sources | 11 | **15** | ----- | ----- | 15 | **31** | 2 | **6** |
| Total Number of Mentions of Trustworthy Sources | 73 | | 13 | | 48 | | 36 | |

* N = number of mentions.
**Percents are of total number of mentions

Overall, whites and Asian-Americans manifest similar perceptions while African-Americans and Latinos share parallel levels of trust in government (zero and two mentions respectively), but express markedly different levels of general concern about environmental risk again suggesting the limited utility of cultural theory. The apparent anomaly (when compared with other groups) posed by Latinos unconcern with environmental risk may have a psychological explanation. One recent study demonstrates that Latinos working as migrant farm workers generally resist addressing or acknowledging the risks imposed on them in their occupation (Vaughan, 1993) Vaughan speculates that economic dependence necessitates the denial of occupational risks. Perceptions that they have no alternative employment opportunities may be particularly strong among Latino migrant farm workers Many of them are illegal aliens at risk of

deportation. Furthermore, a language barrier gives many Latinos less flexibility than African-Americans in their employment opportunities. In an INEL focus group, one woman expresses this sentiment [italics indicate translation from Spanish]:

Woman. *Well, I also want to speak about discrimination, particularly at work. I have always been treated unfairly, specially because I don't speak too much English, I am always been treated unfairly.*

Moderator: Please let me interrupt you in order to translate. Anna just finished saying that she'd also like to talk about discrimination, that she feels like that happens a lot on the job site. *Anything else?*

Woman: *Yes. They are always firing us because we do not speak English well.*

Clearly for this woman the language barrier is a factor in employment.

Although African-Americans and Latinos have limited trust in government, Asians seem to trust the government to inform and protect its citizens. One Asian man, asked whether environmental risk from Fernald effected him personally, showed his faith in government. "You know like the government, when they invented new weapons and they're secret or something. They will pick somewhere in the desert where nobody around in case something happens, some leak out of radiation, or whatsoever, so you won't hurt the mass public. . . ." The level of trust in government exhibited by Asians in the study could be related to deferential, cultural norms.

Concern About Environmental Risk and Trust in Industrial Sources of Risk Information

Predicted Relationship 2: Individuals having higher than average concern about environmental risk will tend to have lower than average levels of trust in industrial sources to truthfully communicate risk

Corollary Relationship 2. Individuals having lower than average concern about environmental risk will tend to have higher than average

levels of trust in industrial sources to truthfully communicate risk.

Table 6-2 reports the raw number of mentions and percentage of total mentions of general concern about environmental risk and trust in industry sources of information. Again, "General concern" reflects concern about environmental risk without qualifiers.[3] Trust in industry sources includes trust afforded to management, employees, and subcontractors of the DOE.

Table 6-2 Mentions of Concern About Environmental Risk and Trust in Industrial Sources of Risk Information by Ethnic or Racial Group

| | Whites [13 groups 124 people] | | African-Americans [6 groups 62 people] | | Asian-Americans [5 groups 46 people] | | Latinos [5 groups 51 people] | |
|---|---|---|---|---|---|---|---|---|
| | N* | %** | N | % | N | % | N | % |
| General Concern About Environmental Risk | 532 | 46 | 293 | 54 | 191 | 40 | 131 | 29 |
| Total Number of Mentions About Environmental Risk | 1143 | | 542 | | 474 | | 451 | |
| Trust in Industry Sources | 7 | 10 | 1 | 8 | 14 | 29 | 9 | 25 |
| Total Number of Mentions of Trustworthy Sources | 73 | | 13 | | 48 | | 36 | |

* N = number of mentions.
**Percents are of total number of mentions

Predicted Relationship 2 holds except for Asians. Whites have high risk perceptions and place little trust in industry to communicate risk. Having the highest level of risk perception, African-Americans only mention trust in industry sources once Latino

[3] See Appendix G

respondents, by comparison, indicate less concern about environmental risk, and have almost as many mentions of trust in industry as Asian-Americans. The apparent anomaly posed by the Asians may be partially accounted for by the fact that the bulk of their mentions of trust in industry sources reflect trust in employees at DOE site. This may reflect personal acquaintance with such employees. Several Asian-American respondents stated that they would trust scientists whom they knew worked at the site. Perhaps for Asians high risk perception and trust in industry sources reflect their contact with scientists working at the sites. Significantly, few people in any group expressed much faith in the industry's management.

Concern About Environmental Risk and Trust in Citizen Group Sources of Risk Information

Predicted Relationship 3: Individuals having higher than average concern about environmental risk will tend to have higher than average levels of trust in citizen group sources to truthfully communicate risk.

Corollary Relationship 3. Individuals having lower than average concern about environmental risk will tend to have higher than average levels of trust in citizen group sources to truthfully communicate risk.

Table 6-3 reports the raw number of mentions and percentage of total mentions of general concern about environmental risk and trust in citizen group sources of information. "General concern" is concern about environmental risk without qualifiers. Although Chapter 5 lumped citizen groups in with "personal sources," the present chapter considers as an alternative to government sources.

Although, Peters, Covello, and McCallum (1997) find no statistically significant evidence to support the hypothesis that increased environmental risk perception increases

Table 6-3. Environmental Risk Perception and Mentions of Trust in Citizen Groups Sources of Risk Information By Ethnic or Racial Group

| | Whites [13 groups 124 people] | | African-Americans [6 groups 62 people] | | Asian-Americans [5 groups 46 people] | | Latinos [5 groups 51 people] | |
|---|---|---|---|---|---|---|---|---|
| | N | % | N | % | N | % | N | % |
| General Concern About Environmental Risk | 532 | **46** | 293 | **54** | 191 | **40** | 131 | **29** |
| Total Number of Mentions About Environmental Risk | 1143 | | 542 | | 474 | | 451 | |
| Trust in Citizen Groups | 3 | **4** | 4 | **31** | 5 | **10** | 1 | **3** |
| Total Number of Mentions of Trustworthy Sources | 73 | | 13 | | 48 | | 36 | |

* N = number of mentions.
**Percents are of total number of mentions.

the trust afforded to citizen groups, the data analyzed here sustains the predicted relationship across all groups. The magnitude of African-Americans' environmental risk perception (see Table 4-1) parallels the tendency of these individuals to consider personal sources, especially citizen groups, as trustworthy information-disseminating sources (see Table 5-1). Latinos, the least likely of all the groups to express general or personal concern about environmental risk (see Table 4-1), have the least number of mentions of trusting citizen groups. This project views citizen groups as both personal and nongovernmental sources of information In the focus group interviews, participants seemed to view citizen group sources as more personal and comprised of individuals whom they knew from their local community. Other nongovernmental sources--outsiders, experts, environmentalists, and the media--tended to be seen as more distant sources

Concern About Environmental Risk and Trust in Nongovernmental Sources of Risk Information

| | |
|---|---|
| Predicted Relationship 4 | Individuals having higher than average concern about environmental risk will tend to have higher than average levels of trust in nongovernmental sources to truthfully communicate risk |
| Corollary Relationship 4 | Individuals having lower than average concern about environmental risk will tend to have higher than average levels of trust in nongovernmental sources to truthfully communicate risk |

Finally, Table 6-4 examines the relationship between environmental risk perception and trust in nongovernmental sources. This table reports the raw number of mentions and percentage of total mentions of general concern about environmental risk and trust in nongovernmental sources of information. "General concern" is concern about environmental risk without qualifiers. Nongovernmental sources include outsiders, experts, environmentalists, and the media.

According to predictions derived from Douglas and Wildavsky's cultural theory, those distrustful of traditional sources of risk information would seek alternatives, such as citizen groups and nongovernmental sources of information. The data provide some tentative evidence that to the extent that ethnic and racial groups express concern about risks they tend to trust nongovernmental sources (outsiders, experts, environmentalists, and the media).

Whites in the sample express general concern about environmental risk, and a desire for nongovernmental sources of risk information. These individuals would turn to outsiders, environmentalists, and experts more than any other ethnic or racial group. Although whites have high risk perceptions, they still afford the second highest level of

Table 6-4 Environmental Risk Perception and Mentions of Trust in Nongovernmental Sources of Risk Information By Ethnic and Racial Group

| | Whites [13 groups 124 people] | | African-Americans [6 groups 62 people] | | Asian-Americans [5 groups 46 people] | | Latinos [5 groups 51 people] | |
|---|---|---|---|---|---|---|---|---|
| | N | % | N | % | N | % | N | % |
| General Concern About Environmental Risk | 532 | **46** | 293 | **54** | 191 | **40** | 131 | **29** |
| Total Number of Mentions About Environmental Risk | 1143 | | 542 | | 474 | | 451 | |
| Trust in Non-Governmental Sources | 45 | **62** | 5 | **38** | 11 | **23** | 19 | **53** |
| Total Number of Mentions of Trustworthy Sources | 73 | | 13 | | 48 | | 36 | |

* N = number of mentions.
**Percents are of total number of mentions.

trust to government. African-Americans, manifesting the greatest concern about environmental risk, would not consider government to be trustworthy, but, rather, rely exclusively on information from nongovernmental sources (especially citizen groups). African-Americans have the lowest number of overall mentions of trust, but 38% of these mentions specified nongovernmental sources. Asian-Americans had the third highest level of concern about environmental risk, and also would consider nongovernmental sources. Latinos, having the lowest concern with environmental risk, would trust the media for risk communication. This may reflect hostility to government sources, in as much as these respondents may turn to the media because it is censorious of government.

The data presented here suggests cultural theory has some insight into how some ethnic and racial groups view environmental risk and how these perceptions affect their trust in traditional institutions (government and industry) as well as citizen and other nongovernmental groups. Generally, white behavior did not substantially depart from what Douglas and Wildavsky's cultural theory predicts, but they did not follow the predicted relationships in the same way as African-Americans. The predicted relationship between environmental risk perception and trust in government, industry, nongovernmental agencies, and citizen groups is most prevalent among African-Americans. Latinos behave as expected with the exception of the relationship between environmental risk perception and the trust afforded to government. Although Latinos do not seem as concerned about environmental risk, they still do not have a high level of trust in government.

Asian-Americans pose an anomaly to the predicted relationship between their environmental risk concern and the trust they placed in industry and government for risk communication. Considering Asians' moderate levels of concern about environmental risk, it was expected that they would be likely to place little trust in these sources. Although, Douglas and Wildavsky's theory sheds light on the relationship between environmental risk concern and trust in information-disseminating institutions, other variables clearly need to be explored to understand better the impact of ethnicity and race on concern about environmental risk.

Immediate Concerns: An Ethnic and Racial Group-Based Comparison

Associations between ethnic and racial group concerns about environmental risk and repositories of trust may be better understood by looking at the focus group participants' mindset. At the beginning of the focus group discussions, the moderator asked respondents to list the two or three local issues that concerned them most at that time. The responses obtained from this activity shed light on how worldviews affect both environmental risk perception and repositories of trust.

The data show clear trends in the variation of local concerns across the distinct ethnic and racial groups examined. Table 6-5 categorizes concern about local matters by ethnic or racial group. The first column identifies categories of concern: Crime, Education, Government, Economy, Environment, DOE Site, and General Society. The category "Crime" encompasses violence, drug use, police injustice, child abuse, and crime in general. "Education" comprises statements concerning the school system, childrearing, general concerns about learning, funding for education, and the dissemination of information in society. "Government" covers those things that require government intervention such as the creation of infrastructure, taxes, politics, welfare reform, health care, freedoms, and rights. The "Economy" category includes local concerns about jobs and unemployment as well as such general economic issues as the cost of living. "Environment" incorporates air and water quality as well as concerns about potential environmental hazards. "DOE Site" is separated from Environment because there is no clear indication on the cards as to whether concern over the site stems from the potential economic problems resulting from site closures or the environmental risks posed by the

sites. The category "General Society" entails a host of social issues including homelessness, social values and morality, gambling, and prejudice.

Table 6-5 provides the raw number of mentions as well as the percentage of mentions per group (column percents). For example, whites listed local concerns about crime 57 times, 15 % of their total mentions. Column percents allow for comparisons among all ethnic and racial groups.

Table 6-5: Local Issues of Concern By Ethnic or Racial Group

| | Whites [11 groups 104 people] | | African-Americans [5 groups 50 people] | | Asian-Americans [5 groups 45 people] | | Latinos [4 groups 43 people] | | Totals |
|---|---|---|---|---|---|---|---|---|---|
| | N | %* | N | % | N | % | N | % | |
| Crime | 57 | **15** | 34 | **22** | 22 | **19** | 28 | **27** | 141 |
| Education | 67 | **18** | 19 | **12** | 7 | **6** | 17 | **16** | 110 |
| Government | 71 | **19** | 17 | **11** | 28 | **25** | 21 | **20** | 137 |
| Economy | 36 | **10** | 26 | **17** | 15 | **13** | 22 | **21** | 99 |
| Environment | 104 | **28** | 36 | **23** | 23 | **20** | ----- | ----- | 163 |
| DOE Site | 14 | **4** | 5 | **3** | 10 | **9** | 2 | **2** | 31 |
| General Society | 25 | **7** | 16 | **10** | 9 | **8** | 15 | **14** | 65 |
| Totals | 374 | | 153 | | 114 | | 105 | | 746 |

*Column Percents

Table 6-5 indicates a distinct variation in the immediate local concerns of the respondents, across ethnic and racial groups. Moreover, this table captures variations in ethnic and racial groups that remain hidden when people are categorized simply as whites

and "nonwhites." Whites do differ from nonwhites, but variation also exists among these nonwhite groups. Whites were most likely to mention concern about the environment (28% of total mentions). This is more than African-Americans (23%) and Asian-Americans (20%), and significantly more than Latinos (with no mentions). Whites also were the least likely among the groups to mention crime concerns while Latinos were the most likely to do so (27% of total mentions). Education concerns also ranked highest within the white group, followed by Latinos, African-Americans, and Asian-Americans with only 6% of their total mentions. Whites were least likely to mention economic concerns. Latinos were most concerned the economy (21% of total mentions), followed by African-Americans (17%) and Asian-Americans (13% of total mentions).

Whites did not substantially differ from nonwhites in the categories of Government, DOE site, and General Society. Concerns about the expectations of government (such as desires for better infrastructure) are voiced most often by Asian-Americans (25% of total mentions) and least often by African-Americans (11%). This pattern logically parallels the previously discussed relationship between trust in government and these groups. Asian-Americans, in this study, are more likely to trust government for risk communication than any other group; African-Americans, the least likely. This finding suggests that Asian-Americans are more likely to look to government to solve problems and provide services than are African-Americans who do not expect government to deliver solutions or services. Their high level of distrust almost certainly relates to African-Americans painful historical with the American government, most chillingly illustrated by the Tuskegee Experiment

In 1932, a medical experiment designed to study how syphilis spreads and kills was conducted in Tuskegee, Alabama by the United States Public Health Service. All 623 subjects--the 399 with syphilis and the 224 in the control group--were African-American men. In 1947, penicillin became the standard treatment for this disease, but the men in the experiment were not informed that they had syphilis and were not treated with penicillin. Run for over 40 years, this experiment was made public in 1972. How might such a revelation of indifference to suffering effect an individual's or group's faith in their government? Would they even want to claim so callous as government as their own? Other harrowing reasons why African-Americans might elect not to trust the government might be addressed almost *ad infinitum*.[4]

Concerns about the DOE site were listed by Asian-Americans more than any other group, followed by whites, African-Americans, and Latinos. The impossibility of determining whether site-specific concerns were environmental or economic vitiates against all but tentative conclusions about why Asian-Americans might register more concerns about these sites than do other groups. Asian-Americans in the sample might have greater levels of education, making them more aware of possible risks from the sites.

Finally, general society concerns were cited more by Latinos than any other group, followed by African-Americans, Asian-Americans, and whites. The Latino mentions were comprised of concerns about racism, housing issues, the homeless, and values. One important trend revealed by the table deserves special emphasis: in the concern card data, the greatest similarities between ethnic and racial groups exist between African-Americans

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[4] See Feagin and Sikes, 1994; Schniderman, Tetlock, and Carmines, 1993; and Kinder and Sanders, 1996.

and Latinos except for two exceptions. First, Latinos were more likely to mention government concerns than were African-Americans. Second, African-Americans mention environmental concern more than Latinos who did not mention it at all. The general similarities between the two groups may be explained by shared concerns about racism and discrimination (which are only listed by African-Americans and Latinos). Exploring these concerns can enhance our understanding of the worldviews of these ethnic and racial groups and their effects risk perception and trust in government and other social institutions.

## The Immediacy of Racism and Discrimination

In the concern card data, Asian-Americans do not mention concerns about discrimination or racism. In contrast, both African-Americans and Latinos 8% of their total mentions concerned racism, discrimination, or group consciousness (for example, "black on black crime"). Again, this measures' importance lies in the fact that they reflect *spontaneous* responses to the question of concerns. One Latino woman from INEL stated: "Basically, the Hispanic community is like invisible. We are not there. And then the only time when we become visible is where there is a drug bust." The response of one INEL Latino man to a question about his concerns stressed racism.

| | |
|---|---|
| Man: | And just the treatment of Latin people. |
| Moderator: | Uh-huh, and what do you mean by the treatment of Latin people? |
| Man: | Being treated as a regular person instead of somebody moving in, you know, they look at you and they think you're going to be causing trouble right off the bat. Don't give you a chance, a fair shake, it's just a bad thing. |

Concerned with the treatment of Latinos, this individual responded to a question by contending that Latinos are not treated fairly. Other participants in the same group voiced similar sentiments.[5]

When listing concerns, many Latino focus group participants raised the spectra of discrimination. The following exchange between participants at INEL illustrates this point:

> Jean: I put more down, I would like to see more places for young teens to go to. There is not very many places here where they can to and

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[5] The following exchange illustrates the concerns expressed in the same INEL Latino focus group ( ____ indicate blanks in the tape and transcript):

> Moderator: Okay, Carlos?
> Man: How about lumbering and any form of discrimination, wildlife policing. All that I experience like I have already known one discrimination. It is in our lives _____ from Mexico. At the hospitals won't *treat* you right because I'm Mexican. . . . And you go to the hospital and--The doctor no touch us but that's only because some Mexican wen shift the temperature, only because some Mexican. And right now, my wife and me, we have to sue the hospital. And I have a couple of more friends in the dealers, the stores, a lot of shit here, a lot of discrimination for Mexicans. . .
> Moderator: And what you were saying before that in the hospital that you go to you get inferior service--
> Man: In the stores everywhere. You can see the people laughing to Mexicans if somebody don't speak English, she's laughing to other people. You want to just ask them for the price of flour, *shoe* or shirt, the people laughing No help.
> Woman: Well there's a lot of that too going around and that's for the people themselves. I'm tired of it I know going to the Social Security Office and outside people from Mexico who can't wait, but there's a Spanish girl up there that knows what the guy's saying and they will not talk Spanish there because they know English And I don't think that's even fair for the Mexican people that have learned and need some help some. At least that what I feel, if I can help somebody I'll do it. If I'm right there and somebody can't understand, I'll go ahead and offer my help. There's some people that I know that will not in big office like Social Security like _____ that will not come up and do it. And it's your own people, our own people. Which I don't think is right.

have clean fun. Another thing is the media that I would like to see, the media here is terrible, the TV, the newspapers, they put things in it and they don't retract when something they did was wrong

Moderator: Can you give me an example of what bothers you with that?

Jean: Okay. My daughter's boyfriend had an antique gun in his car, and he took it to school because the teacher won't--, so he picks up my daughter at school, he puts the gun under the seat and then he pulled out to look at it. The next thing they know the police were there, they take him down to the police station. Policeman say that gunshot was fired. Andy I mean, this gun doesn't work it was an antique gun, and they were--you know? And it was never in the paper that this gun doesn't work, that it was an antique, so it make kids, that are good kids, look bad. And then on TV, when it comes to . . . , and I don't really feel like I'm discriminated against. But it always seems like when there are Mexicans, or even blacks for that matter, that have done something, it's on every single night, and another nationality could do the same thing and you hear it once and that's the end of it. Just it makes Hispanics look bad, and it makes me mad. And then, going back to the other kids, you know, there is a lot of skateboarders, and they are good kids, and my boys used to skateboard when they were younger, but they won't let them do that anymore, you know? And they are not doing anything to have fun. Keeping out of trouble, just skating, and they don't let them do that. So that's why I put the need for places for kids.

Moderator: Okay. Thanks. Wendy?

Wendy: Mine is pretty much the same as the policemen. Like kind of behind that bar, and there was this white guy who was out shooting this big rifle and we called the cops and they went and told the guy not to shoot anymore because he is white, and he was out shooting four nights in row, and they never did nothing. So the last two times we called they just didn't show up at all. Its just like the issue, the Mexican are the outcasts are usual with anything. I could just get a Mexican bar they were just trying to shut it down. They said there are too many fights. But there is not more fights in a Mexican bar than there is in a white bar. An issue is like the farmers down there. If a Mexican goes to work for a farmer they treat them like they don't know what they are doing, they pay them really low. And its just like my nephew, my niece is married and her husband works for a farmer and he knows how to run the grain combines, potato combines,--hydrogen and he only wants to pay they like 2.50 an hour, and because he figures you know, put there you don't

> want to learn about the--, you just want to get the money and go back to wherever you're from. And he is going his citizenship and everything, and he wants to learn about, more about the farming and everything. Farmers in there don't.

Clearly, discriminatory treatment in the past effects the worldview of these participants in the present. African-Americans raised similar issues in their focus group. One male respondent from SRS typifies responses to questions about local concerns:

> Man: Yes. My issues are violence, racism and employment.
>
> Moderator: All right, violence?
>
> Man: Violence, well let's say violence is like all the things that's going on throughout the world, the killing, the people not respecting each other, or as you know people's rights and everything. But racism I still see it as people looking at other people as far as their color. There's just a lot of racism still going on today.

An African-American man from SRS lists "drug usage, racism, [and] black-on-black crime" as his immediate concerns. Another African-American man from SRS also expressed group-based concerns:

> Man: The first one is stereotypes of young black youth. That's the first one. Stereotypes of young black. .
>
> Moderator: Okay.
>
> Man: Understanding importance of knowledge and one's history and also education is the second one

Although group concerns and awareness of discrimination appeared in African-American and Latino focus groups, the African-Americans in the sample showed the greatest magnitude of concern about racism. As one African-American male respondent from INEL commented: "I put in my environmental concerns behind racism." The

following exchange from a SRS group reflects the suspicions of pervasive environmental racism held by many African-Americans:

Moderator: Okay. We looking at #13. This is the halfway point. Do you know anyone in your community whose health has been affected by pollution of any type? What makes you think so? How has their health been affected? What's the source of that problem? How bad is it? Think health and somebody you know in your community whose health has been affected by what type of pollution.

Man: I don't know what is causing it, but I think everybody here is going to bear witness to it. We have an enormous amount of prostate cancer among black men over the age of 50.

Moderator: Right here?

Man: Yes sir. And we would like to know what's causing that? All around here if you'd ask, there's some male in the family, black, that has prostate cancer. We need to know what causes that. We need to know is it in the air, is it in the water, is it the food or is it something that they are giving us that we don't know.

This man couples his certainty that something is wrong to an assumption that someone might intentionally be at fault. He desires information, but seems unlikely to trust the sinister "they" whom he believes capable of willful malevolence.

Awareness that environmental pollution disproportionately effects minority groups surfaced in the responses of Latino INEL participants. The following exchange illustrates:

Woman: The fumes that are being released. If you go up there and stand there, I mean, you can get those fumes I would say maybe once a week in the south area of town and everybody blames it on the sugar factory. And you can see it in the newspaper, coming that we're getting fumes from the sugar factory. It's not all the sugar factory. It's not all the sugar factory. If you have been in that area, you're familiar with the factory, and it's--What are they treating, they're producing?

Man: Methane gas

Woman: Methane gas, is that what they're producing?

Man: Yes, you can smell it It's there

Woman: Yes. It's there and it smells like rotten eggs.

Man: One thing about this area, the south part area, there's more Hispanics that live in that area than anywhere else. So, it's them complaining, it's not that big of a deal.

When asked if they knew anyone in their community effected by pollution of any type, African-Americans from INEL stated that many individuals who had worked at the local machine corporation got cancer and died prematurely. The job with the highest casualties was generally filled by African-Americans.

Male speaker: And that job was basically given to a lot of African-American people.

Male speaker: Yeah. African-American people up until the year what? Sixty-six? When another manager taken over out there (inaudible) and then he say you can go up the ladder and get them off the tap patrol.

Male speaker: Because you couldn't go anywhere else out there. That's about all there were. That's the only place you could work

Although the preceding instance of environmental racism ended 30 years earlier, it continued to resonate in forming the suspicions and risk perceptions of African-Americans into the present.

## Economic Dependence: A Serious Consideration and a Powerful Force

Most of the minority participants feared the potential loss of jobs and negative economic ramifications of site closures. After a lengthy discussion of how the Oak Ridge site should be closed, the following exchange in an Asian focus group indicates the complexity of the situation.

Moderator: It wouldn't have an effect on your family either way? You and your family?

Man: There are pros and cons if they open or close. They close it down, there's a lot of people out of a job. They stay open, you improve on it, and looking into the possibilities of having accidents, to prevent them, and to educate the people working there to keep _____ going on there and to have a safe working environment.

Woman: I guess open, because that way they'll be able to do all the research to see whether or not .. because they're doing a lot of energy research. It's not only nuclear, I'm sure they're looking at other things. The more research and information they have available, then we'll be able to make an informed decision on what we want as a nation, nuclear power or something else.

Woman: It also gave a lot of opportunities, more like an open door, for the people outside of the United States to come to the United States to work. There were a lot of engineers that came to the United States and worked for Oak Ridge. If you're going to close that, well, closing the opportunity for other people all over the world.

Woman: I'd say open, not thinking about myself but other people as far as jobs go. My brother-in-law works there. I'd prefer it open.

Awareness of their economic dependence seems especially prevalent among African-Americans from Oak Ridge.

(Blank in tape)
Moderator: --if the site were closed?

Woman: I'd say open.

Moderator: Why? Let's start with Sherri, and we'll go around.

Woman: Yeah, that's all right with me. I would not eat--

(Laughter.)

Moderator: Why, won't you eat? Okay. Come on, Gwen.

Woman: Lack of jobs. A lot of people--

Moderator: Keep it open?

Woman: Uh-huh.

Moderator: Mike?

Man: Well, it would be devastating to the whole economy, and I say keep it open and clean it up.

Moderator: Mary, you still with us?

Woman: Sure.

Moderator: All right. How do you feel?

Woman: Keep it open.

Moderator: Why?

Woman. Well, like they said, I mean, it will destroy a lot of jobs, get rid of a lot of jobs

Moderator: William?

Man: Just keep it open. This the only thing that is supporting life as it's know in Oak Ridge.

(Laughter )

Woman: You got that right.

Moderator: All right. Norm?

Man: I'd say the same things, as bad as I hate to say it, but keep it open, yeah.

Moderator: That right?

Man: Well, I don't work, but it would mean other jobs for the other people there, so I say keep it open for that purpose of other people more than myself.

Moderator: All right. Fair enough. Dolores?

Woman: Keep it open, 'cause I need a job.

Moderator: That's fair to me. Charlie?

Man. It didn't take long for us to want to open that plant up, did it?

(Laughter.)

Moderator. All right.

Man: Oak Ridge gave me a life, so if it take it, that fair, keep it open. [underlining added by the author]

Moderator: Good, all right, all right. Gwen?

Woman: It's got to stay open.

Moderator. For what?

Woman: Jobs, money.

Moderator: Mike?

Man: Same thing.

Moderator: Same thing as what I asked Lou.

Man: Yeah, Lou going to say same thing.

Woman: Keep it open because it employs a lot of people in a lot of areas.

Man: But what's we mean, you know, keep it open, but clean up the environment.

Man. That's right.

Despite their awareness of its lethal potential, their economic dependence on Oak Ridge leads these focus group participants to fatalistic resignation: they can laugh about their plight, but they feel powerless to change it. The man whose tongue-in-cheek logic leads him to the conclusion that because Oak Ridge gave him his life, it is okay for Oak Ridge to take it back succinctly captured the irony of their situation. The question arises

why economic dependence does not lend African-Americans to deny the risks as Vaughan (1995) showed to be the case with Latino migrant farm workers and pesticides.[6]

## Homogeneity of Experience

Group homogeneity of experience may be an important factor in determining the predictive value of a cultural theory and identifying those whom groups trust for information about risk. Several components define an ethnic or racial group's homogeneity of experience:

1. What is the ethnic diversity within the group?
2. When did the group come to the United States?
3. Under what conditions did the group come to the United States?

For example, African-Americans seem to have a more homogeneous experience than other groups. The ethnic diversity within the group is low; most African-Americans in the United States are native-born. Few immigrants came to the United States after the closing of the slave trade in the first decade of 19th century. Most African-Africans were forcibly migrated to America.

The cultural theory of Douglas and Wildavsky (1982) applies most easily to African-Americans. This group's experiences suggests greater homogeneity than that of Asian-Americans, Latinos, or whites.[7] In 1619 witnessed the beginning of the forced importation of African-Americans to America (Bennett, 1996, 148). Over some 400 years, this group has suffered myriad injustices from enslavement through Jim Crow laws and disfranchisement to present-day discrimination in the workplace. Often their needs

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[6] As discussed earlier in this chapter, Vaughan (1995) found that Latino migrant farm workers deny the pesticide-related risks to which they are exposed in their work.

[7] Caribbean blacks comprise only a small portion of the black population in the United States.

and interests have been ignored or denied by government. Not surprisingly, therefore, this study finds African-Americans looking to government for risk communication or anything else less than the other groups studied here.[8] The homogeneity of this group's historical experience helps explain why Douglas and Wildavsky's cultural theory seems to work best for them.

Latinos, Asian-Americans, and Whites do not fit the predictions of this cultural theory as well as do African-Americans. Latinos and Asian-Americans are not as homogeneous in their group experiences and in their immigration patterns or experiences as are African-Americans. Although both of these groups have been discriminated against by individuals and have had negative experiences with the government,[9] these groups have not had the same deep and contested historical relationship with government as have African-Americans. The bulk of the Latino and Asian-American populations immigrated to the United States in the last century.

Ethnically speaking, both Latinos and Asian-Americans are more diverse than African-Americans. Asian-Americans in the United States immigrated largely from China, Japan, Korea, Vietnam, and the Philippines, and tend to see "themselves in terms of their respective ethnic groups" rather than as "Asian-Americans" (National Conference of Christians and Jews, 1991, 2.1). Suzanne Oboler points out the danger of lumping all Latinos together into the single category "Hispanic":

> As a result [of such generalizing], millions of people of a variety of national backgrounds are put into a single "ethnic" category, and no allowances are made for their varied racial, class, linguistic, and gender experiences. The term ignores,

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[8] See Table 6-5.

[9] For example, Latino migratory farm workers lack of protection and the forced placement of Japanese-Americans in concentration camps.

> for example, the distinct and diverse experiences of descendants of the U.S. conquest, such as the Chicanos, and those of Puerto Rican populations, colonized by the United States at the turn of the century. Its users often neglect to contextualize the specific histories and cultures that differentiate these two groups, both from one another and from more recent immigrant arrivals, whether from Mexico, Central or South America, or the Spanish-speaking Caribbean nations. In so doing, longtime native-born U.S. citizens and residents are combined with more recently arrived economic immigrants who may have crossed the U.S. border yesterday (Oboler, 1995, 1).

Oboler's point must be considered in any study exploring the explanatory value of ethnic and racial cultural variables.

Whites--English Americans, Irish Americans, German Americans-- also have varied patterns of immigration to the United States, however these individuals began their migration with the first colonies. Unlike African-Americans, whites chose to come to America. These individuals are the majority group in the United States and have substantial power in a society by majority rule. Whites do not completely fit cultural theory's predictions, but white individuals in the study do not pose any significant anomalies unlike Asian-Americans and Latinos.[10]

## Conclusion: Toward a Cultural Worldview Explanation of the Relationship Between Concern About Environmental Risk and Repositories of Trust

The focus group data are more complex than Douglas and Wildavsky's cultural model. Although their theory has some predictive value, a more nuanced approach is necessary to account for such variables as ethnicity and race. A cultural lens involves more than present nationality or socioeconomic status. Perceptions of racism, economic dependence, and homogeneity of experience are all vital in explaining the relationship

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[10] As discussed earlier, Asian-Americans have unexpectedly high levels of trust in government considering their concern about environmental risk; Latinos unexpectedly low levels of trust.

between risk and trust across ethnic and racial groups. The evidence presented here shows historical experiences and cultural influences to be central variables in explaining racial and ethnic groups environmental risk concern and trust in repositories. By including ethnicity and race in their cultural explanations of risk, scholars can develop more exhaustive explanations of the complex relationship between risk and trust and its policy implications.

Policymakers need to take into account differences between whites and nonwhites, among nonwhites, and *within* each distinct ethnic and racial group. Although examining the specific views of various ethnic and racial groups is a step in the right direction, the variations in these groups' experiences necessitate that policymakers further disaggregate each distinct ethnic and racial group. This chapter provides a starting point for understanding how ethnicity and race relate to concerns about environmental risk and trust in those communicating such risk.

# CHAPTER 7
# CONCLUSION

Moderator: Let's say that you suggested things should be left here [at the Rocky Flats site]. [Would] anybody like to see it [Rocky Flats' facilities] shipped somewhere else?

Man: Oh the Pentagon would be nice.
(Native American Citizens, Rocky Flats)

Substantial differences across African-Americans, Asian-Americans, Latinos, and whites emerged from analysis of the data generated by the focus groups conducted by CERE near the Department of Energy (DOE) nuclear weapons facilities. Qualitative impressions drawn from Native American focus groups reinforce that ethnicity matters in levels of environmental concern and in whom individuals trust for risk communication. In the discussion that follows, data from the Native American focus groups are explored and compared with many of the major findings from previous chapters. Next, this study's policy implications and subsequent recommendations are reviewed for policymakers. Finally, the conceptual importance of this study is discussed in terms of what insight its findings provide and what needs to be researched in the future.

## What About Native Americans?

CERE also conducted three focus groups with Native Americans. Because the questions that had been asked of the other groups were not posed in the Native American focus groups and the Native participants knew that they would be discussing their

concerns about the local DOE facility,[1] the researcher did not analyze the Native American focus groups systematically. However, qualitative impressions drawn from the Native American focus groups suggest that Natives share some things in common with the other minority groups. Nevertheless, there are important differences which seem to set this group apart from the others.

To determine the extent to which Native perceptions resemble those held by members of other groups, it is necessary to return to the patterns of environmental risk concern across ethnic and racial groups that were described in Chapter 4. Table 7-1 summarizes these findings.

Table 7-1: Degree of Mention of Environmental Risk Concerns. By Ethnic or Racial Group*

| | Do Not Know | Not Concerned | Slightly Concerned | General Concern | Personal Concern | Action Concern |
|---|---|---|---|---|---|---|
| Whites** | L*** | M | M | M | M | H |
| African-Americans | H | M | L | H | M | L |
| Asian-Americans | M | L | M | M | H | H |
| Latinos | H | H | H | L | L | L |

*Responses to 15 of the 27 questions asked in all focus groups analyzed here were coded. These questions dealt with environmental quality and possible risks from the sites.
** Whites = 13 groups comprised of 124 people; African-Americans = 6 groups comprised of 62 people; Asian-Americans = 5 groups comprised of 46 people; and Latinos =5 groups comprised of 51 people.
*** H (High) = Greater than 25% Above the Mean Number of Mentions Across All Groups.
M (Medium) = Between 25% Below and 25% Above the Mean Number of Mentions Across All Groups
L (Low) = Less than 25% Below the Mean Number of Mentions Across All Groups.

[1] Those groups were "Type A" which were self-selected. See Chapter 3.

Like all the other groups, Native Americans desired more information about the risks from the sites. When asked in the SRS focus group about their concerns regarding the DOE, many individuals expressed the desire for more risk information

> Woman: Yeah, it ain't gonna kill 'em. Let 'em know, straight up, what they're doing, what they're not doing, what precautions they've taken, what they've not taken, where they're dumping, what they're dumping. People would know. People would have a choice.

A qualitative assessment of the Native American focus groups, indicates that these individuals share with many African Americans a high level of general concern about environmental risk. However, the Native Americans--similar to Asian-Americans and whites--are more likely than African-Americans to take actions as a result of this concern. One Native woman's comments about drinking water illustrate her readiness to take steps to compensate for environmental degradation.

> Moderator: What about the water? The water that you drink, the water in the streams, the water in the river?
>
> Woman: I remember as a child the taste of Denver water was so sweet it was incredible. It was like deep well water--that sweetness that you experience. That sweetness has not been here in 25 years.
>
> Moderator: Do any of you get public or private or well-water? Most of you public.
>
> Woman: I order water and use the public for bathing and we drink bottled. Sometimes when we run out we go back to the tap and we can definitely taste all that stuff.

The romantic nostalgia embedded in this woman's statements hint at a unique element in the Native American focus groups. The Native Americans seem to have a different way of looking at the environment and environmentalism than do individuals from the other groups. Native Americans generally view the environment in collective,

holistic, and even spiritual terms. When asked by her Moderator about prevailing winds, one woman replied, "We all share the same air." Another woman--somewhat less succinctly--contextualized the environmental situation around the DOE sites in spiritual terms.

> It all goes back to what the spirit told us. Only the spirit can answer these kinds of questions. Only the spirit can tell what they do with the plutonium. They weren't supposed to take it out the earth to begin with. They messed with it and they broke it into pieces and they went from atoms to hydrogen and nitrogen bombs. Only the spirit can tell what to do. . . . I'm not religious I have the ____ [indicates blank in the transcript], and its based on the original technology of this universe which far surpasses anything they have created today. They have to get any understanding of the original technology so they can maybe have a glimpse into the technology they have created and get some answers.

How do Native Americans' patterns of trust compare with those of the other racial and ethnic groups? Table 7-2 summarizes the patterns of trust shown for the other groups in the study.[2]

Table 7-2: Relative Frequency of Mentions of Trustworthy Sources of Information About the DOE Sites: By Ethnic or Racial Group*

| | Governmental | Personal | Nongovernmental | Industrial |
|---|---|---|---|---|
| Whites** | I*** | I | F | I |
| African-Americans | ___ | I | I | I |
| Asian-Americans | F | F | I | F |
| Latinos | I | I | F | F |

* In all focus groups analyzed here the following question was asked: "Who would you trust to give you accurate information about (Name site) and the activities at (Name site)?" Mentions were derived as a result of this question.
** Whites = 13 groups comprised of 124 people; African-Americans = 6 groups comprised of 62 people; Asian-Americans = 5 groups comprised of 46 people; and Latinos =5 groups comprised of 51 people
*** F (Frequent) = Greater than 25% Above the Mean Number of Mentions Across All Groups.
I (Infrequent) = No More than 25% Above the Mean Number of Mentions Across All Groups.
----- = No mentions.

[2] See Chapter 5

Because the moderators in two out of three groups failed to ask group members who they trusted, only spontaneous indications of (dis)trust can be assessed for the Native American focus groups conducted at the Savannah River and Rocky Flats Sites. Congruence between Native-Americans and African-Americans appears most pronounced in connection with trust in government. Both groups disregarded government as trustworthy sources altogether. When the moderator asked one Native group what concerned them about Rocky Flats, one respondent affirmed her unwillingness to trust the federal government.

> My concern is that there is a lot more going on than we are going to ever be told. It's always said that everything is so hushed up, everything is so quiet, so secretive. We are always being--certain people that do the research and go in there and get the information. Somehow the information never gets out into the public and I don't trust the Federal government.

Another Rocky Flats Native American woman's distrust incorporated the focus groups themselves. Deeply cynical, she anticipated the worst from any initiative, even the process of generating information in which she was an active participant.

> I think that one of my biggest concerns right now is why we're here, why they suddenly care what we think, what we feel. It's daily as far as I'm concerned. That land out there is dead. That land will be dead for fifteen generations, at least. That land is my people's land and it hurts to drive by _____ to know that my people hunted there. My people fished these streams. And why suddenly do they care what I think or feel? I think that when I was first approached about this that was my very first reaction. . . I don't think that we should touch it because we tend to screw things up.

As with African Americans, a historical legacy of pain and frustration has instilled in many Native Americans a deep distrust, if not outright antipathy, toward government. A Rocky Flats tribal leader's comments illuminate such a relationship.

> We don't trust the government, but thinking logically, why would we have people come from Washington and help it We have had that in our whole generation people trying to "Indian people." They've tried to civilize us They've tried to educate us They've tried, but they don't realize that we maintain what is sacred and important to us and that we will take and learn as much as we need to. That's all I can say.

A Native American woman in the same focus group elaborated on this distrust in government, but with an added measure of complexity. Specifically, she distrusted the government's ability to obtain reliable information on citizens' concerns.

> Moderator: Do you feel that your concerns generated about the local site have been voiced today? Do you think that you have been able to express yourself about this particular site?
>
> Woman: They never get the real authorities from our communities. So this group, they have to consult the authorities from our communities that the people trust. Not the authorities that win the elections. Not the recognized spokespeople who are like she said, so comfortable, they got their piece of . so they've already adopted that false value system.

The challenge for policymakers is to overcome this and similar perceptions that they are divorced from the individuals whose lives they effect.

## Implications for Risk Communicators

James O. Mason (1989) pinpoints four crucial principles in government risk communication: they are the credibility of the source, quality of the message, use of intermediaries, and involvement of the concerned public. All four principles apply to racial and ethnic minorities; however, in particular, risk communicators need also be attentive to the distinct perspectives and concerns within each group.

Credibility

According to Mason, "credibility is difficult to establish, easy to lose, and almost impossible to regain once lost" (1989, 23). Vincent T. Covello, Peter M. Sandman, Paul Slovic call "trust and credibility . . . [a risk communicator's] most precious assets" (1991, 68). Only by fully disclosing as much of the truth as possible in communicating risk can trust be gained. The DOE did not tell the truth about the safety, health, and environmental risks to which it exposed the public. Not surprisingly, this loss of credibility is the greatest hurdle the agency faces. The DOE's new "openness initiative," constitutes an attempt to regain lost trust, but success seems unlikely considering the DOE's past record.[3]

Quality of the Message

The quality of the message relates closely to the credibility of the source. Increasingly, experts are coming to realize that their own subjectivity colors the information that they disseminate and few complex issues can be understood completely.[4] Scientific and economic--including those based on benefit-cost scenarios--arguments for risk management options may not be the most compelling for nor adequately reach citizens. Furthermore, solutions to the problems of waste management at DOE sites cannot be presented to the public when key technologies have yet to be developed. To

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[3] See Chapter 1.

[4] Christopher J. Daggett provides an example:

> risk assessment is far-from-perfect art, and scientific consensus on dose-response is a rare commodity. For example, a National Academy of Sciences report on saccharin concluded that over 70 years the expected number of cases of human bladder cancer resulting form daily exposure to 120 milligrams of saccharin could be anywhere from 0.22 to 1,144,000. Given the imperfections of risk assessment, it is obvious that communicating the results of these assessments is, and will continue to be, an inherently difficult task (1989, 31).

gain and maintain trust, it is necessary for organizations like the DOE to frankly communicate the limits of their knowledge, resources, and abilities.

The Search for Intermediaries

Given the high level of distrust manifested by all ethnic and racial groups towards government, risk communicators and policymakers would be wise to solicit the aid of third parties to act as intermediaries between them and the stakeholders. The data analyzed here identifies citizen groups, and outside experts to be likely candidates for such brokering positions. This departs from Mason's suggestion that policymakers use the news media to communicate with the public: of the focus groups analyzed here, only Latinos exhibited high levels of trust in the media. Although the media reaches many individuals, a more localized approach through the use of citizen groups is more likely to reach individuals regardless of race or ethnicity. Because of substantial group variation in patterns of trust, policymakers would be well-advised to investigate possibilities on a case by case basis.

Involving the Public

Crucial to the generation of trust is the inclusion of the concerned public: "Risk communication is most effective if the people are involved from the earliest possible stage When the public knows our plans and is included in the process, our goals can become their goals and the outcomes are more likely to be comprehended and accepted" (Mason, 1989, 25). Projects like the CERE study as well as other initiatives by the DOE and other agencies to include the public are likely to help bolster the credibility of such agencies

## Recommendations

Several recommendations--based on Mason's work and the findings of this study--can be made concerning the communication of environmental risk at the DOE sites The DOE should do the following five things

1. Continue with its new policy of forthrightness concerning its past activities.

2. Make substantial efforts to provide more information to citizens living near the sites.

3. Consult and coordinate with citizen groups and outside scientific experts to effectively communicate information about risk.

4 Recognize attitudinal differences between whites and nonwhites, among different ethnic and racial groups, and *within* each distinct ethnic or racial group.

5. Be aware that consensus building is difficult and time consuming. Including stakeholder citizens in the processes of government will result in more legitimate policy, but is unlikely to simplify the tasks of policymakers.

## Generalizability of the Findings

How generalizable are these findings? Because the analysis presented here derives from focus group data, it is not necessarily generalizable to the American population as a whole. Still, the implications of these data are important for developing theories of risk communication and for interpreting other survey data. Assertions made in the preceding discussions can be considered exploratory when they are generalized to a larger

population. Yet, they offer fresh ideas and suggest new hypotheses that may be tested by later researchers [5]

## Where Do We Go From Here?

The data analyzed here suggests that differences in concern about environmental risk and trust repositories exist between whites and nonwhites, among nonwhites, and within each group. Although this study reveals a high degree of pluralism in the attitudes of distinct ethnic and racial groups, a more systematic exploration of these differences among groups and within each group is needed. For instance, there are a series of national cultures within the Asian-American and Latino communities. Are intergroup attitudes effected by different ethnic backgrounds?

Concern about environmental risk does not mean that individuals will take action to reduce or eliminate risk. Future research should consider to what extent attitudes, such as those towards environmental risk, translate into political behavior--community activism, issue voting, lobbying--across ethnic and racial groups. If, as this dissertation suggests, African-Americans have high levels of concern about environmental risk, why do these individuals seem unable or unwilling to take action to address these concerns?

This dissertation relates cultural factors to risk perception and determinations of who individuals trust for communications about risk; future research should address the significance of such situational factors as the influence of local or national press coverage and employment at industries posing significant health and environmental risks. The data

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[5] Furthermore, the richness of response found in the focus groups analyzed here warrant survey researchers restructuring their standard format and using more open-ended questions.

used in this dissertation may reflect a tendency for Latinos to ignore environmental risks because of economic dependence on specific industries. The interplay between the cultural and the situational may help explain attitudes about the environment and risk communicators.

This study concentrates on concern about environmental risk in areas likely to be more environmentally degraded than the rest of the country. In these areas, risks are concrete rather than abstractions and individuals can relate physical consitions to risk exposure. At Hanford, group participants understand their high rate of thyroid cancer to be sympotmatic of the environmental risks to which they have been exposed. Future research should explore how less immediate risk affects attitudes about the environment.

An important variable that could not be explored in this dissertation was the impact of education or level of knowledge on concerns about environmental risk across distinct ethnic or racial groups. It is likely that the participants in this study had less education than other population segments. Educated members of different ethnic and racial groups may reveal different patterns of awareness and concern about their risk environment. Better educated individuals may be less fearful of risks precisely because they understand them: they may also feel more confident to act on their concerns about risk politically. These possibilities merit further study.

In all the focus groups, participants concomitantly betrayed considerable ignorance and a desire for knowledge about the possible risks from nuclear weapons facilities and other local hazards. How would additional information affect each group's view of the hazards? This study pinpointed potential trustworthy sources of information for each ethnic or racial group, but what kind of information would be most helpful and accessible

to each group? Do distinct ethnic and racial groups respond differently to the types of information they are given?

Scholars advocate incorporating the public in risk-management decision making (Mason, 1989), but how this should be accomplished is less easily determined. There is unlikely to be any consensus as to what risks merit priority action and who should be entrusted to make such priority decisions. In some instances, it may be impossible to reach consensus because of the varied ways that different ethnic and racial groups view risk, the environment, and institutions. In a more optimistic vein, in building towards consensus, policymakers will need to devote time and energy to address the concerns of different ethnic and racial groups. By doing this, policymakers can alleviate, or even dispel, perceptions--like those held by some Native Americans from Rocky Flats--that the government is out of touch with the 'real' feelings, needs, and fears of its citizens.

# APPENDIX A
# GAO SUMMARY OF CONCLUSIONS OF DEMOGRAPHIC STUDIES

| Study's author and date | Number and type(s) of facilities | Sponsor | Main conclusions | |
|---|---|---|---|---|
| | | | Race/ethnicity | Income |
| United Church of Christ Commission for Racial Justice and Public Data Access, Inc., 1987 | 415 RCRA[a] commercial hazardous waste facilities and 18,164 CERCLA[b] "uncontrolled" toxic waste sites | United Church of Christ Commission for Racial Justice | ZIP codes where facilities were located were more likely to have higher minority populations[c]; race/ethnicity was a stronger indicator of proximity to waste facilities than income. | ZIP codes where facilities were located were more likely to have populations with lower incomes. |
| Claritas, Inc. for Waste Management, Inc., 1992 | 132 RCRA hazardous and nonhazardous waste facilities operated by Waste Management, Inc. | Waste Management, Inc. | Most ZIP codes where facilities were located had a lower percentage of minorities[c] than the host state. | Not studied. |
| E. B. Attah for EPA's Region IV, 1992 | 4,855 CERCLA hazardous waste sites | EPA and Clark Atlanta University | At the county level, the study found no relationship between the number of sites and the percentage of minorities.[d] At the census tract[e] level, the average number of CERCLA sites increased as the percentage of minorities increased. | Not studied. |
| VIGYAN, Inc., for EPA, 1992 | 35 RCRA commercial hazardous waste landfills | EPA | In the majority of cases, the percentages of blacks and Hispanics[f] living near landfills were equal to or less than the percentages of blacks and Hispanics living in the surrounding county. (GAO's conclusions based on EPA's data.) | Not studied. |
| John A. Hird, 1993 | 788 Superfund sites[f] | University of Massachusetts-Amherst | Counties with more minorities[d] had more Superfund sites when other socioeconomic factors were held constant. | No link was found between poorer counties and the number of Superfund sites they contained. |

| Study's author and date | Number and type(s) of facilities | Sponsor | Main conclusions | |
|---|---|---|---|---|
| | | | Race/ethnicity | Income |
| Rae Zimmerman, 1993 | 814 Superfund sites | EPA and New York University | When the author used unweighted averages, the percentages of blacks and Hispanics[h] in Superfund communities were lower than they were in the nation. When averages were weighted to take into account the communities' population, blacks and Hispanics were found to be more prevalent in Superfund communities than is typical of the nation. | When the author used unweighted averages, the poverty rate in Superfund communities was comparable to that in the nation. On a weighted basis, the poverty rate in Superfund communities was slightly higher but still comparable to that in the nation. The association of poverty with location was less pronounced than that of race/ethnicity. |
| Center for Policy Alternatives, 1994 (update of United Church of Christ study) | 530 RCRA commercial hazardous waste facilities | National Association for the Advancement of Colored People and United Church of Christ Commission for Racial Justice | Minority populations[c] in 1993 were more likely to live in ZIP codes where facilities are located than they were in 1980; race/ethnicity was still a stronger indicator of proximity to a facility than income. | ZIP codes where facilities were located were more likely to have populations with lower incomes |
| Social and Demographic Research Institute, University of Massachusetts-Amherst, 1994 | 454 RCRA commercial hazardous waste facilities | Waste Management, Inc., and the Institute for Chemical Waste Management | Using three different geographic study areas in metropolitan areas, the authors concluded that there was no consistent national-level association between the location of facilities and the percentage of blacks and Hispanics[h] living nearby. | Using three different geographic study areas, the authors concluded that there was no consistent national-level association between the location of facilities and the percentage of low-income people living nearby. |

| Study's author and date | Number and type(s) of facilities | Sponsor | Main conclusions | |
|---|---|---|---|---|
| | | | Race/ethnicity | Income |
| Rae Zimmerman, for EPA's Region II, 1994 | 210 Superfund sites | EPA | Within 1 mile of the sites, the weighted and unweighted mean and median percentages for minority populations[f] were below or about the same as the proportions in the state. | Rents and housing values were used as a proxy for income. Values within 1-mile area were lower than state averages. |
| ICF Inc., and VIGYAN, Inc., for EPA. 1994 | 41 cement plants, including 29 that burned hazardous waste as fuel and 12 that did not. | EPA | The percentage of minorities[c] within 1 and 5 miles of the plants was greater about as often as it was less than the percentage of minorities in the host county. (GAO's conclusion based on EPA's data.) | The percentage of people below the poverty line within 1 and 5 miles of the plants was greater about as often as it was less than the poverty rate for the host county (GAO's conclusion based on EPA's data.) |

[a]RCRA is the Resource Conservation and Recovery Act of 1976, as amended, which regulates the generation, storage, treatment, disposal, and transportation of hazardous and, to some extent, nonhazardous solid waste.

[b]CERCLA is the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended, also known as Superfund CERCLA "uncontrolled hazardous waste sites refers to sites that have been listed by EPA as needing an assessment to determine whether they are serious enough to be placed on the National Priorities List for cleanup under CERCLA.

[c]In this study, minority populations are defined as including persons of Hispanic origin and blacks, American Indians, Asians and Pacific Islanders, Eskimos and Aleuts, and others that are nonwhite and not of Hispanic origin. No double counting of persons of Hispanic origin and racial minorities occurs

[d]In this study, only race was analyzed. People of Hispanic origin were not analyzed

[e]The Department of Commerce's Bureau of the Census defines census tracts as small, locally defined statistical areas in metropolitan areas and some counties. They generally have stable boundaries and an average population of 4,000.

[f]In this study, people of Hispanic origin were analyzed independently of racial categories. Thus, Hispanics may be included in the data on racial minorities to some extent.

[g]"Superfund sites" refers to sites on the National Priorities List. They are sites that EPA has evaluated and determined should be cleaned up under CERCLA. As of December 1994, there were 1,288 sites on or proposed for the list.

[h]In this study, only people of Hispanic origin and blacks were analyzed. Also, because people of Hispanic origin were analyzed independently of blacks, Hispanics may be included in the data shown for blacks to some extent.

Source: GAO/RCED-95-84 Demographics of People Near Waste Facilities

# APPENDIX B
# TYPE B FOCUS GROUP PARTICIPANT RECRUITMENT SPECIFICATIONS (DEMOGRAPHIC CHARACTERISTICS)

**Type B Focus Group Participant Recruitment Specifications: Savannah River**

| Target Group | Geographic Specifications | Demographic Specifications |
|---|---|---|
| Downgradient (Fisherman/shrimper) | Beaufort county zip codes: 29901, 29902, 29903, 29910, 29920, 29935, 29936<br><br>Hampton county zip codes: 29911, 29913, 29916, 29918, 29922, 29924, 29932, 29944, 29943<br><br>Colleton county zip codes: 29433, 29435, 29438, 29446, 29929,29425, 29082, 29474, 29475, 29481, 29488, 29493<br><br>Jasper county zip codes: 29927, 29934, 29943 | Age: 25 or older<br>Education: no specification<br>Length of time at present residence: no specification<br>Gender: no specification<br>Income: no specification<br>Geographic distribution: distribution across specified counties<br>Additional specification: livelihood is in fishing/shrimping industry |
| African American (Group 1) | Beaufort county zip codes: 29901, 29902, 29903, 29910, 29920, 29935, 29936 | Age: 25 or older<br>Education: no specification<br>Length of time at present residence: no specification<br>Gender: equal male/female representation<br>Income: no specification<br>Geographic distribution: no distribution requirement |
| African American (Group 2) | Orangeburg county zip codes 29115, 29116, 29018, 29115, 29048, 29047, 29059, 29133, 29142, 29146 | Age: 25 or older<br>Education: no specification<br>Length of time at present residence: no specification<br>Gender: equal male/female representation<br>Income: above poverty level<br>Geographic distribution: no requirement for distribution across specified counties |
| African American (Group 3) | Chatham zip codes: 31302, 31322, 31323<br>Effingham zip codes: 31303, 31312, 31326, 31329 | Age: 25 or older<br>Education: no specification<br>Length of time at present residence: no specification<br>Gender: equal male/female representation<br>Income: below poverty level<br>Geographic distribution: no requirement for distribution across specified counties |

**Savannah River Continued**

| Target Group | Geographic Specifications | Demographic Specifications |
|---|---|---|
| Asian American | Augusta (including Ft. Gordon, Martines, Blythe, Evans, Gracewood, Grovetown, Harlem, Hephzibah)<br>Zip codes: 30907, 30906, 30909, 30901, 30903, 30904, 30905, 30815, 30812, 30809, 30814, 30813 | Age. 25 or older<br>Education: no specification<br>Length of time at present residence: no specification<br>Gender equal male/female representation<br>Income: no specification<br>Geographic distribution: no requirement for distribution across specified areas |
| White American | Barnwell zip codes. 29812, 29817, 29853 | Age:25-59<br>Education: no specification<br>Length of time at present residence: no specification<br>Gender equal male/female representation<br>Income: no specification<br>Geographic distribution: no requirement for distribution across specified zip codes |
| Students | South Carolina State University phone prefixes: 531, 533, 534, 534 and 536<br>Denmark zip code: 29042 | Age: 18-24<br>Education: college student any level<br>Length of time at present residence: no specification<br>Gender: equal male/female representation<br>Income: no specification<br>Geographic distribution: no distribution requirement students attending South Carolina State University (Orangeburg County), Vorhees College (Bamberg County) or Denmark Technical Institute (Bamberg County) |
| Senior citizens | Phone exchanges 706 | Age: 60+<br>Education: no specification<br>Length of time at present residence: no specification<br>Gender equal male/female representation<br>Income: no specification<br>Geographic distribution. no distribution specification |

**Type B Focus Group Participant Recruitment Specifications: Oak Ridge**

| Target Group | Geographic Specifications | Demographic Specifications |
|---|---|---|
| Downwind | Phone exchanges (area code 615): Anderson (481, 482, 483, 435, 457); Knox (966, *675,* 927, 671); Loudon (986, 988); Roane (376, 882)<br><br>Zip codes not covered by phone exchanges: Morgan (37770, 37726, 37887, 37872, 37829); Loudon (37846); Monroe (37874); McMinn (37303) | Age: 25 to 59<br>Education: no specification<br>Length of time at present residence. equal distribution (less than 20 years/20 years or more)<br>Gender: equal male/female representation<br>Income: no specification<br>Geographic distribution. distribution across all counties |
| Downgradient | Zip codes: Anderson (37830, 37831); Roane (37763, 37748, 37854); Meigs (37880, 37322, 37336); Rhea (37395 37831, 37321, 37332, 37338); Hamilton (37308 37337 37377 37379, 37373, 37343, 37422) | Age: 25 to 59<br>Education no specification<br>Length of time at present residence no specification<br>Gender equal male/female representation<br>Income above poverty level<br>Geographic distribution: distribution across all counties |
| African American | Phone exchanges: 481, 482, 483 | Age. 25 or older<br>Education: no specification<br>Length of time at present residence: no specification<br>Gender: equal male/female representation<br>Income: no specification<br>Geographic distribution: no requirement for distribution across phone exchanges |
| Hispanic | Drawn from downwind specifications plus the following zip codes: Anderson (37828, 37705, 37769);Knox (37950, 37901, 37927, 37921, 37928, 37914, 37921 37940 37939 37912, 37920, 37914, 37901, 37928, 37939; 37930; 37918; 37938, 37924, 37919, 37923, 37922, 37932) | Age: 25 or older<br>Education: no specification<br>Length of time at present residence no 5 cification<br>Gender: equal male/female representation<br>Income: no specification<br>Geographic distribution. no requirement for distribution across counties |

**Oak Ridge Continued**

| Target Group | Geographic Specifications | Demographic Specifications |
|---|---|---|
| Asian American | Drawn from downwind specifications plus the following zip codes: 37853, 37801, 37701, 37882, 37886, 37705, 37769, 37950, 37901, 37927, 37921, 37928, 37914, 37921, 37940, 37939, 37912, 37920, 37914, 37901, 37928, 37939, 37930, 37918, 37938, 37924, 37919, 37923, 37922, 37932 | Age: 25 or older<br>Education: no specification<br>Length of time at present residence: no specification<br>Gender: equal male/female representation<br>Income: no specification<br>Geographic distribution: no requirement for distribution across counties |
| Senior citizens | Drawn from downwind and downgradient specifications plus the following zip codes: 37853, 37801, 37701, 37882, 37886, 37705, 37769, 37950, 37901, 37927, 3792 1, 37928, 37914, 37921, 37940, 37939, 37912, 37920, 37914, 37901, 37928, 37939, 37930, 37918, 37938, 37924, 37919, 37923, 37922, 37932 | Age: 60+<br>Education: no specification<br>Length of time at present residence: no specification<br>Gender equal male/female representation<br>Income: no specification<br>Geographic distribution: no requirement for distribution across counties |
| Site-specific subpopulation (downgradient rural poor) | Roane (37763, 37748, 37854); Meigs (37880, 37322, 37336); Rhea (37395, 37831, 37321, 37332, 37338); Hamilton (37308, 37337, 37377, 37379, 37373, 37343) | Age: 25 to 59<br>Education: no specification<br>Length of time at present residence: no specification<br>Gender: equal male/female representation<br>Geographic distribution: distribution across all counties<br>Income: below poverty level<br>Additional specification: participant considers himself/herself to live in a rural area |

**Type B Focus Group Participant Recruitment Specifications: Fernald**

| Target Group | Geographic Specifications | Demographic Specifications |
|---|---|---|
| Downwind | Butler County, OH zip codes: 45013, 45014, 45015, 45011, 45069, 45056<br><br>Hamilton County, OR zip codes: 45030, 45252, 45251, 45240, 45218, 45246, 45241 | Age: 25 to 59<br>Education: no specification<br>Length of time at present residence: equal distribution <20 yrs, >20 yrs<br>Gender: equal male/female representation<br>Income: no specification<br>Geographic distribution: distribution across all counties and towns |
| Downgradient | Butler County, OH zip code: 45014<br><br>Hamilton County, OH zip codes: 45242, 45013, 45252, 45247, 45251, 45030, 45041, 45001, 45052, 45051, 45248, 45233, 45002<br><br>Dearborn County, IN zip codes: 47060, 47022, 47025, 47001<br>Boone County, KY zip codes: 41048 | Age: 25 10 59<br>Education: no specification<br>Length of time at present residence: equal distribution <20 yrs, >20 yrs<br>Gender: equal male/female representation<br>Income: no specification<br>Geographic distribution: distribution across all cities and counties |
| African American | Bufler County, OH zip codes: 45056, 45053, 45013, 45011, 45015, 45014, 45069<br><br>Hamilton County, OH zip codes: 45030, 45013, 45002, 45052, 45251, 45001, 45248, 45224, 45252, 45251, 45240, 45218, 45231, 45239, 45211, 45223, 45215, 45246<br><br>Dearborn County, IN zip codes: 45060, 45025 | Age: 25 or older<br>Education: no specification<br>Length of time at present residence: No specification<br>Gender: equal male/female representation<br>Income: no specification<br>Geographic distribution no requirement for dzstnbution across phone exchanges |
| Hispanic | All counties in study area | Age: 25 or older<br>Education: no specification<br>Length of time at present residence: no specification<br>Gender equal male/female representation<br>Income: no specification<br>Geographic distribution: no requirement for distribution across counties |

**Fernald Continued**

| Target Group | Geographic Specifications | Demographic Specifications |
|---|---|---|
| Asian American | All counties in study area | Age: 25 or older<br>Education no specification<br>Length of time at present residence no specification<br>Gender equal male/female representation<br>Income no specification<br>Geographic distribution no requirement for distribution across counties |
| Senior citizens | Butler County, OH zip codes: 45056, 45053, 45013 45011,45015,45014<br><br>Hamilton County, OH zip codes: 45030, 45013, 45002, 45052, 45251, 45001, 45248, 45224, 45252, 45251, 45240, 45218, 45231, 45239, 45211, 45223<br><br>Dearborn County, IN zip codes. 45060, 45025 | Age 60+<br>Education: no specification<br>Length of time at present residence: no specification<br>Gender: equal male/female representation<br>Income: no specification<br>Geographic distribution: no requirement for distribution across counties |
| Site-specific subpopulation (urban Appalachian) | Butler County, OR: all zip codes<br><br>Boone County, KY: all zip codes<br><br>Campbell County, KY: all zip codes<br><br>Hamilton County, OH zip codes: 45204, 45210, 45220, 45205, 45217, 45216, 45214, 45202, 45233, 45251, 45225 | Age: 25 to 59<br>Education: no specification<br>Length of time at present residence no specification<br>Gender: equal male/female representation<br>Geographic distribution no requirement<br>Income no specification<br>Additional specification participant considers himself/herself or parents to be from the region known as Appalachia |

**Type B Focus Group Participant Recruitment Specifications: Hanford**

| Target Group | Geographic Specifications | Demographic Specifications |
|---|---|---|
| Downwind | Towns: Mesa, Connell, Ritzville, Rongold, Matthews Corner (phone exchange 266), Basin City | Age: 25 to 59<br>Education: no specification<br>Length of time at present residence. equal distribution <30 yrs, >30 yrs<br>Gender: equal male/female representation<br>Income: no specification<br>Geographic distribution: distribution across all counties and towns<br>Additional specification: non-farmers |
| Downgradient | Cities. Patterson (phone exchange 875), Hood River, Umatilla (zip code 97882), Hood River (zip code 97031) | Age. 25 to 59<br>Education: no specification<br>Length of time at present residence: no specification<br>Gender: equal male/female representation<br>Income: above poverty level<br>Geographic distribution: distribution across all cities and counties |
| African American | Geographic distribution. no requirement Cities: Pasco phone exchanges 545, 546, 547 | Age: 25 or older<br>Education: no specification<br>Length of time at present residence: no specification<br>Gender equal male/female representation<br>Income: no specification |
| Asian American | Cities: Richland zip code 99352 | Age: 25 or older<br>Education: no specification<br>Length of time at present residence. no specification<br>Gender: equal male/female representation<br>Income: no specification<br>Geographic distribution. no requirement |

**Hanford Continued**

| Target Group | Geographic Specifications | Demographic Specifications |
|---|---|---|
| Senior citizens | Cities: Pasco, Richland, Pasco, Kennewick | Age: 60+<br>Education: no specification<br>Length of time at present residence: no specification<br>Gender: equal male/female representation<br>Income: no specification<br>Geographic distribution: no requirement |
| Site-specific subpopulation (downwind farmers) | Towns: Mesa, Connell, Ritzville, Rongold, Matthews Corner (phone exchange 266), Basin City | Age: 25 and above<br>Education: no specification<br>Length of time at present residence: equal distribution <30 yrs, >30 yrs<br>Gender: no specification<br>Geographic distribution: distribution across all specified areas<br>Income: no specification<br>Additional specification: participant owns or works on a commercial farm or ranch |

**Type B Focus Group Participant Recruitment Specifications: INEL**

| Target Group | Geographic Specifications | Demographic Specifications |
|---|---|---|
| Downwind (rural and small town residents) | Phone exchanges. Mud Lake (663), Terreton (663), Hamer (662), Mont,'iew (657) | Age: 25 to 59<br>Education: no specification<br>Length of time at present residence: more than 7 yeais<br>Gender: equal male/female representation<br>Income: no specification<br>Geographic distribution: distribution across all specified areas |
| Downgradient (rural and small town residents) | Phone exchanges: Minidoka (531) Care} (823) Picabo (788), Rupert (436), Paul (438), Acequia (436) Heyburn (678), Burley (677, 678), Declo (654) Bulil (543) Filer (326), Hansen (423), Kimberley (423) Murtaugh (432) Jerome (324), Razelton (829), Eden (825) Dietrich (544), Richfield (487), Shoshone (886) Bliss (352) Goodin[illegible] (934). Hagenman (837) Wendell (536) | Age 25 to 59<br>Education no specification<br>Length of time at present residence More than 7 years<br>Gender equal male/female representation<br>Income no specification<br>Geographic distribution: distribution across all specified areas to extent possible no City of Twin Falls residents |
| African American | Phone exchanges. Pocatello (232, 233, 234, 235, 236, 237, 238, 239, 241, 242, 251, 989), Blackfoot (785), Idaho Falls (521, 522, 523, 524, 525, 526, 527, 528, 529, 533, 534, 589, 979), American Falls (226) and Twin Falls (733, 734, 735, 736 737 738) | Age: 25 or older<br>Education: no specification<br>Length of time at present residence: no specification<br>Gender equal male/female representation<br>Income no specification<br>Geographic distribution no requirement for distribution across cities specified |
| Hispanic (Group 1) | Phone exchanges: Chubbuck, Fort Hall Pocatello (232 233, 234, 235, 236, 237, 238, 239 241 242 25, 989) Blackfoot (785), Moreland (684) Riverside (684) Pingree (684), Springfield (328), Sterling (328), Aberdeen (397), American Falls (226) | Age 25 or older<br>Education no specification<br>Length of time at present residence no specification<br>Gender: equal male/female representation<br>Income: no specification<br>Geographic distribution: no requirement for equal distribution across specified towns; however, equal distribution between participants who live in towns and those who live in surrounding rural areas |

**INEL Continued**

| Target Group | Geographic Specifications | Demographic Specifications |
|---|---|---|
| Hispanic (Group 2) | Phone exchanges: Burley (677, 678), Delco (654), Buhi (543), Filer (326), Hansen (423), Kimberley (423), Murtaugh (432), Twin Falls (733, 734, 735, 736, 737, 738), Bliss (352), Gooding (934), Hagerman (837), Wendell (536) | Age: 25 or older<br>Education: no specification<br>Length of time at present residence: no specification<br>Gender: equal male/female representation<br>Income: no specification<br>Geographic distribution: no requirement for equal distribution across specified towns, however, equal distribution between participants who live in towns and those who live in surrounding rural areas |
| Senior citizens | All phone exchanges in study area (see attached list) | Age: 60+<br>Education: no specification<br>Length of time at present residence: no specification<br>Gender: equal male/female representation<br>Income: no specification<br>Geographic distribution: no requirement for distribution across counties |
| Site-specific subpopulation (Ragerman Valley fish farmers) | Phone exchanges: Gooding (934), Bliss (352), Wendell (536), Hagerman (837), Buhi (543), Jerome (324), Kimberley (423), Hansen (423), Filer (326), and Eden (825) | Age: 25 or older<br>Education: no specification<br>Length of time at present residence: 5 years or more<br>Gender: no criteria<br>Geographic distribution: no requirement for distribution across towns<br>Income: no criteria<br>Additional specification: participant owns, operates, or works at a fish hatchery/farm |

**Type B Focus Group Participant Recruitment Specifications: Rocky Flats**

| Target Group | Geographic Specifications | Demographic Specifications |
|---|---|---|
| Downwind | Cities/towns: Arvada, Golden, Wheatridge, Broomfield, Lafayette, Louisville, Boulder, Westminster, Thornton, Northglenn, Federal Heights, NW Denver zip codes 80211, 80212, 80214, 80221, 80229, 80233, 80234, 80241, Nederland | Age: 25 to 59<br>Education: no specification<br>Length of time at present residence: equal distribution <20 yrs, >20 yrs<br>Gender equal male/female representation<br>Income no specification<br>Geographic distribution: distribution across counties of Jefferson Boulder Adams Denver Gilpin and Clear Creek |
| Downgradient | Cities/towns: Standley Lake, Westminster Noithglenn, Brighton, Broomfield, Erie, Dacono, Ft Lupton | Age 25 to 59<br>Education no specification<br>Length of time at present residence equal distribution <20 yrs >20 yrs<br>Gender equal male/female representation<br>Income no specification<br>Geographic distribution. distribution across all cities/towns |
| Mrican American | Cities/towns: Arvada, Wheatridge, Westminster Federal Heights, Thornton, Boulder, Broomfield NW Denver zip codes 80211,80212,80214, 80221,80229 80233 80234 80241 | Age 25 or older<br>Education no specification<br>Length of time at present residence no specification<br>Gender equal male/female representation<br>Income no specification<br>Geographic distribution distribution across all cities/towns |
| Hispanic | Cities/towns: Arvada, Golden, Wheatridge Westminster Thornton, Federal Heights, Boulder, Broomfield Louisville NW Denver zip codes 80211, 80212, 80214 80221 80229 80233, 80234, 80241 | Age 25 or older<br>Education no specification<br>Length of time at present residence no specification<br>Gender equal mal~'lemale representation<br>Income. no specification<br>Geographic distribution: distribution across all cities/towns |

**Rocky Flats Continued**

| Target Group | Geographic Specifications | Demographic Specifications |
|---|---|---|
| Asian American | Cities/towns: Arvada, Golden, Wheatridge, Westminster, Thornton, Federal Heights, Boulder, Broomfield, NW Denver zip codes 80211, 80212,80214, 80221, 80229,80233, 80234, 80241 | Age: 25 or older<br>Education: no specification<br>Length of time at present residence: no specification<br>Gender: equal male/female representation<br>Income: no specification<br>Geographic distribution: distribution across all cities/towns |
| Senior citizens | Cities/towns: Arvada, Golden, Wheatridge Westminster Thornton, Federal Heights, Boulder, Broomfield NW Den, er zip codes 80211,80212, 80214,80221 80229 80233 80234, 80241 | Age 60+<br>Education no specification<br>Length of time at present residence no specification<br>Gender equal male/female representation<br>Income no specification<br>Geographic distribution no requirement for distribution across cities/towns |
| Site-specific subpopulation (Farmer/rancher) | Cities/towns: Arvada, Westminster, Brighton, Broomfield Louisville, Lafayette, Erie, Dacono, Ft. Lupton | Age 25 and up<br>Education no specification<br>Length of time at present residence: equal distribution <20 yrs, >20 yrs<br>Gender no specification<br>Geographic distribution: distribution across all cities/towns<br>Income: no specification<br>Additional specification: participant owns or works on a commercial farm or ranch |

# APPENDIX C
# TYPE A AND TYPE B FOCUS GROUP DISCUSSION GUIDES

**TYPE A FOCUS GROUP DISCUSSION GUIDE**
**(MEMBERS OF PROXIMATE POPULATIONS)**

**INTRODUCTION:**

*THANK YOU ALL FOR TAKING YOUR TIME THIS EVENING (AFTERNOON) TO COME AND TALK WITH ME ABOUT SOME RISK AND CLEANUP ISSUES AT (NAME SITE). MY NAME IS_____ . AND I WILL BE MODERATING OUR GROUP DISCUSSION WE WILL BE MAKING AN AUDIO TAPE OF THIS SESSION TO BE SURE THAT WE DON'T MISS ANY IMPORTANT COMMENTS, SO WE WILL ONLY BE USING FIRST NAMES TO ADDRESS ONE ANOTHER. I WOULD LIKE TO ASSURE YOU THAT IN THIS STUDY WE ARE INTERESTED ONLY IN YOUR VIEWS AND YOUR COMMENTS. WE ARE NOT INTERESTED IN THE IDENTITY OF ANYONE MAKING COMMENTS, SO PLEASE FEEL FREE TO SPEAK CANDIDLY AND OPENLY THERE ARE NO RIGHT OR WRONG ANSWERS TO ANY OF THE QUESTIONS THAT I WILL ASK WE ARE INTERESTED ONLY IN YOUR OPINIONS OUR DISCUSSION WILL BE VERY CASUAL. I ASK ONLY THAT NOT MORE THAN ONE PERSON SPEAK AT A 7IM'E, SO THAT WE ARE ALL ABLE TO FOLLOW EVERYONE'S COMMENTS.*

*I WOULD LIKE TO BE SURE THAT YOU ALL KNOW THAT YOUR PARTICIPATION IN OUR GROUP IS ENTIRELY VOLUNTARY ANY PARTICIPANT MAY WITHDRAW FROM THE GROUP AT ANY TIME WITHOUT PREJUDICE, ILL-WILL, OR PENALTY OF ANY KIND. NOW JUST SIT BACK AND RELAX AND LET'S GET STARTED. I THINK THAT YOU WILL FIND THE GROUP BOTH INTERESTING AND ENJOYABLE.*

**PHASE ONE: MODERATOR: DISCUSSION OF ITEMS IN THIS PHASE SHOULD CONSUME APPROXIMATELY 20 MINUTES IN TOTAL. PLEASE WATCH THE TIME ON DISCUSSION THROUGHOUT, AS COMPLETION IS VERY IMPORTANT.**

1. Does this area have much air pollution?
   PROBES: What evidence of air pollution do you see, (or what leads you to believe there
   Is not much)?
   Is it serious?
   Where do you think it comes from?
   Does it effect you personally? How?

2. What about quality of the water in lakes, streams and rivers around here?
   PROBES: What evidence of water pollution do you see?
   Where do you think it comes from?
   Do you or members of your family swim in the lakes, streams or rivers around here?
   Does the quality of the water in lakes, streams and rivers around here affect you personally?

**IF PROBLEMS ARE IDENTIFIED, ASK GROUP MEMBERS TO EXPLAIN WHAT THEY THINK CAUSES THESE PROBLEMS AND HOW SERIOUS THEY THINK THESE PROBLEMS ARE.**

3. Do you, or members of your family, fish? If so, do you eat the fish?
   PROBES: Do you think that the fish in your area are affected by pollution?
   What makes you think so?
   What do you think causes this?

4 Do you hunt? IF SO, do you eat the game?
   PROBES: Do you think that the game in your area is affected by pollution?
   What makes you think so (or not)?
   What do you think causes this?

5. Are you aware of any other environmental problems or pollution in this area which may have affected plants or fish and wildlife?
   PROBES: What do you think causes these problems?
   Do you think that these problems are serious?

6. Do you think that the environment in your area is more affected by pollution or by things like logging, land development or other things?
   PROBES: IF OTHER THINGS, What kinds of things?
   What kinds of problems do these other things create?

7. Where does your drinking water come from?
   PROBES: Public water systems? private systems? wells?
   Do you have any concerns about well water around here?
   If you drink well water, have you had your well water tested? Why?

8. Are there any problems with the quality of your drinking water?
   PROBES: What kind of problems?
   Do you filter your water? Why or why not?

9. Do you know anyone in your community whose health has been affected by pollution of any type?
   PROBES: What makes you think so?
   How has their health been affected?
   What do you think are the sources of these problems?
   How serious do you think these problems are?

PHASE TWO: MODERATOR- DISCUSSION OF ITEMS IN THIS PHASE SHOULD BE HELD TO APPROXIMATELY 50 MINUTES

10. What concerns, if any, do you have about (Name site)?
   PROBES: Why that?
   Which concerns you most?

11. What have you heard about activities at (name site)?
   PROBES: How did you hear this?

12. Do you have any particular concerns about the cleanup at (name site)?
    PROBES: IF YES, why are you concerned about these particular things? How serious are your concerns? Why?
    Do you think that these things effect you personally?
    Do you think that effective technologies are available for cleanup at this time? Why or why not?
    If there's a choice between treating contaminated soil or waste on the site, or having contaminated material transported off-site for treatment, which would you prefer to see happen? Why?

13. Do you have any other recommendations about the cleanup of wastes at (Name site)?
    PROBES: Do you think that DOE has enough funds made available to effectively clean up (Name site)?

14. How serious do you think the problems are with the wastes at (name site)?
    PROBES: What makes you think so?
    Are there specific chemicals, materials or substances that you are concerned about? Why?
    Are there any specific areas or locations inside the facility which concern you? Which one(s)? Why?
    Are you more concerned about the effects of wastes on public health, worker health and safety, or the environment? Why?

15. Do you think that DOE has enough treatment, storage and disposal facilities at (Name site)?
    PROBES: Are you more concerned about the storage of certain chemicals, materials or substances at the site, or the migration of any of these things off-site?

PHASE THREE. MODERATOR: DISCUSSION OF ITEMS IN THIS PHASE SHOULD BE HELD TO APPROXIMATELY 50 MINUTES

16. Where do you get MOST of your information about activities at (name site)?

17. Do you feel that you have enough information about the ongoing activities at (Name site)?-
    PROBE: IF NOT, What kind of information would you like to have?

18. Do you think the information you currently have about ~ame site) and activities at ~ame site) is accurate?
    PROBES. Why? Or why not?
    Who would you trust to give you accurate information about (Name site) and the activities at (Name site)?
    IF A VARIETY OF SOURCES ARE MENTIONED, ASK GROUP TO RANK THOSE MENTIONED FROM MOST TRUSTWORTHY TO LEAST TRUSTWORTHY

19. If you could make one recommendation concerning (Name site) to a govemmerit official who could actually do something about (Name site), what would that recommendation be?

20. If funding at (Name site) were to increase, where do you think the money should go?
    PROBES If funding were to decrease, where do you think the reductions should come from?

21. Do you think that citizens should be involved in decision making at (Name site)?

    PROBES. IF SO, In what ways?
    What can be done to make citizen involvement more effective?

22. what do you see as the future of this site?
    PROBES. Is that the best thing that could happen?

23. Do you feel that your concerns about the local DOE site have been voiced today (tonight)?
    PROBES: IF NOT, Could you please take a minute and tell me about those concerns that you have not had an opportunity' to talk about?

24. We're so happy that you were able to come tonight. Could you please tell me what motivated you to take the time to come?

AT THIS POINT, RESPONDENTS ARE TO BE SINCERELY THANKED FOR THE VERY HELPFUL INFORMATION THAT THEY HAVE PROVIDED THROUGHOUT THE SESSION AND TOLD THAT YOU NEED THEM TO DO JUST ONE MORE THING BEFORE THEY LEAVE. TELL THEM THAT IT WILL ONLY TAKE 5 MINUTES. THEN DISTRIBUTE THE FOCUS GROUP PARTICIPANT PROFILE QUESTIONNAIRE. WHEN ALL QUESTIONNAIRES HAVE BEEN COLLECTED, THE GROUP IS DISMISSED.

MODERATOR: PLEASE BE EXTREMELY CAREFUL TO LABEL ALL TAPES, GROUPS OF PARTICIPANT PROFILES, AND GROUPS OF INFORMED CONSENT FORMS WITH THE DATE, TIME, AND LOCATION OF THE GROUP THAT THEY REPRESENT, AS

WELL AS WITH THE NAME OF THE MODERATOR OF THAT GROUP. DO THIS IMMEDIATELY FOLLOWING COMPLETION OF EACH GROUP.

IT IS OF THE GREATEST IMPORTANCE THAT ALL GROUP MATERIALS BE PROPERLY IDENTIFIED FOR ANALYSIS AND REPORTING PURPOSES.

TYPE B FOCUS GROUP DISCUSSION GUIDE

INTRODUCTION:

*THANK YOU ALL FOR TAKING YOUR TIME THIS EVENING (AFTERNOON) TO COME AND TALK WITH ME ABOUT SOME ISSUES WHICH MAY BE OF CONCERN IN YOUR COMMUNITY. MY NAME IS_____, AND I WILL BE MODERATING OUR GROUP DISCUSSION. WE WILL BE MAKING AN AUDIO TAPE OF THIS SESSION TO BE SURE THAT WE DON'T MISS ANY IMPORTANT COMMENTS, SO WE WILL ONLY BE USING ONLY FIRST NAMES TO ADDRESS ONE ANOTHER. . I WOULD LIKE TO ASSURE YOU THAT IN THIS STUDY WE ARE INTERESTED ONLY IN YOUR VIEWS AND YOUR COMMENTS. WE ARE NOT INTERESTED IN THE IDENTITY OF ANYONE MAKING COMMENTS, SO PLEASE FEEL FREE TO SPEAK CANDIDLY AND OPENLY. THERE ARE NO RIGHT OR WRONG ANSWERS TO ANY OF THE QUESTIONS THAT I WILL ASK. WE ARE INTERESTED ONLY IN YOUR OPINIONS. OUR DISCUSSION WILL BE VERY CASUAL I ASK ONLY THAT NOT MORE THAN ONE PERSON SPEAK AT A TIME, SO THAT WE ARE ALL ABLE TO FOLLOW EVERYONE'S COMMENTS.*

*AS I WAS NOT INVOLVED WITH RECRUITING YOU TO COME TONIGHT (TODAY), I WOULD LIKE TO BE SURE THAT YOU ALL KNOW THAT YOUR PARTICIPATION IN OUR GROUP IS ENTIRELY VOLUNTARY ANY PARTICIPANT MAY WITHDRAW FROM THE GROUP AT ANY TIME WITHOUT PREJUDICE, ILL-WILL, OR PENALTY OF ANY KIND, INCLUDING LOSS OF COMPENSATION. NOW JUST SIT BACK AND RELAX AND LET'S GET STARTED. I THINK THAT YOU WILL FIND THE GROUP BOTH INTERESTING AND ENJOYABLE.*

PHASE ONE

PASS OUT A 4" x 6" CARD TO EACH PARTICIPANT (PLEASE BE ESPECIALLY SENSITIVE TO THE FACT THAT SOME PARTICIPANTS IN SOME GROUPS MAY HAVE DIFFICULTY IN READING AND WRITING. WITHOUT DRAWING ATTENTION TO THIS FACT PLEASE QUIETLY WALK AROUND THE TABLE AS PARTICIPANTS ARE COMPLETING THIS TASK AND WITH GREAT SENSITIVITY ASSIST ANY WHO MAY BE HAVING DIFFICULTY. PLEASE QUIETLY ASSIST THESE SAME PEOPLE IN COMPLETING THE PARTICIPANT PROFILE QUESTIONNAIRE AT THE END OF THE SESSION.)

1. As we get ready to begin tonight's (this afternoon's) session, would each of you please write down the 2 or 3 local issues which concern you the most at this time? Please DO NOT write your name on the card. AFTER THE GROUP IS GIVEN A FEW MINUTES TO DO THIS, THEN GO AROUND THE TABLE AND ASK EACH PERSON TO READ WHAT THEY WROTE DOWN TO THE REST OF THE GROUP

2. IF ANYONE MENTIONED THE ENVIRONMENT OR ENVIRONMENTAL ISSUES USE THIS AS A LEAD INTO ASKING THE GROUP what kinds of things do you think of when you are asked to talk about the environment?

3. Does this area have much air pollution?
   PROBES. What evidence of air pollution do you see, (or what leads you to believe there is not much)?
   Is it serious?
   Where do you think it comes from?
   Does it affect you personally?

4 What about quality of the water in lakes, streams and rivers around here?
   PROBES. What evidence of water pollution do you see? where do you think it comes from? Does it affect you personally'?
   IF PROBLEMS ARE IDENTIFIED, ASK GROUP MEMBERS TO EXPLAIN WHAT THEY THINK CAUSES THESE PROBLEMS AND HOW SERIOUS THEY THINK THESE PROBLEMS ARE.

(IN APPROPRIATE GROUPS MODIFY THE NEXT QUESTION TO ASK ABOUT THE POSSIBLE EFFECTS OF POLLUTION ON COMMERCIAL FISHING OR WATER-RELATED BUSINESS)

5. Do you, or members of your family fish? IF SO, Do you eat the fish?
   PROBES: Do you think that the fish in your area are affected by pollution? What makes you think so?
   What do you think causes this?

6. Do you hunt? IF SO, Do you eat the game?
   PROBES: Do you think that the game in your area is affected by pollution?
   What makes you think so (or not)? What do you think causes this?

7. Are you aware of any other environmental problems or pollution in this area which may have affected plants or fish and wildlife?
   PROBES: What do you think causes these problems? Do you think that these problems are serious?

8. Do you think that the environment in your area is more affected by pollution or by things like logging or land development?
   PROBES. IF OTHER THINGS, What kinds of things? What kinds of problems do these other things create?

9. Where does your drinking water come from?
   PROBES: Public water systems? private systems? wells?
   Do you have any concerns about well water around here? If you drink well water, you have your well water tested? Why?

10. Are there any problems with the quality of your drinking water?
   PROBES: What kind of problems?
   Do you filter your water? Why or why not?

PHASE TWO

11. All things considered, how would you compare the environmental problems in this area to those in other parts of your state?
    PROBES: Do you think that they are more serious, less serious? How come?

12. How would you compare the environmental problems in your area with those in other parts of the US?
    PROBES: More serious? Less serious? why?

13. Do you know anyone in your community whose health has been affected by pollution of any type?
    PROBES. What makes you think so?
    How has their health been affected?What do you think are the sources of these problems?
    How serious do you think these problems are?

14. Do you happen to know if any workers in your area are exposed on the job to things that might harm their health?
    PROBES What makes you think so?
    Where do they work?
    In what ways do you think these workers' health has been affected?

15. If you had to name the most important source or sources of pollution in your area, what would that or those be?

    PROBES: Why that one? Any others?
    ASK ABOUT SPECIFIC ACTIVITIES CAUSING POLLUTION IF A COMPANY OR ORGANIZATION IS NAMED HERE. ASK ALSO ABOUT SPECIFIC POLLUTANTS IF THE GROUP NAMES A VARIETY OF IMPORTANT SOURCES OF POLLUTION, ASK THE GROUP TO RANK THOSE NAMED.

IF THE GROUP NAMES THE LOCAL DOE FACILITY, PROBE THEM TO CLARIFY THEIR CONCERNS, ESPECIALLY WHETHER MENTION OF THE DOE FACILITY RESULTS FROM PAST OPERATIONS OR CURRENT OPERATIONS. IF THE DOE FACILITY IS NOT MENTIONED, DO NOT ASK ABOUT IT AT THIS POINT.

PHASE THREE

16. IF THE LOCAL DOE FACILITY HAS BEEN MENTIONED BY THE GROUP AT SOME TIME PRIOR TO THIS QUESTION, ASK Some of you have already mentioned (Name site). Before this discussion, what had you heard about (Name site)?
    IF THE FACILITY HAS NOT BEEN MENTIONED UP TO THIS POINT, ASK How many of you have heard about the Department of Energy site at (Name site)? READ COUNT ONTO TAPE.
    PROBES: When I mention (Name site), what is the first thing that comes to mind?
    What have you heard about the Department of Energy site at (Name site)?
    Is there any particular thing that concerns you about (Name site)?
    ONLY IF THEY MENTION PAST PROBLEMS ASK Has anything been done about past problems you have heard of at (Name site)?

17. Have you heard anything about cleanup activities at (name site)?
PROBES: What have you heard?
How did you hear this?
What do you think about these cleanup activities?

MODERATOR SAY TO THE GROUP: For those of you who may not have heard of (name DOE site), this is a facility which was established in 19__ by the federal government, and which is run by (name of contractor). It (state what is done on the site, e.g. manufactures plutonium) and employs approximately ____ people. Cleanup was begun in 19__ and is being conducted by the Department of Energy and its contractors.

18. How serious do you think the problems are with the wastes at (name site)?
PROBES: What makes you think so?
Are there problems with any specific chemicals, materials or substances that you are concerned about?
How would you compare these problems with other local problems ?

19. Specifically, what concerns you most about (Name site)?

PROBES: Are you more concerned about the current conditions at (Name site), or about what might happen at the site in the future?Are you more concerned about the storage of certain chemicals, materials or substances at the site, or the migration of any of these things offsite? Are you concerned about any operations or practices at the site? Why? ASK THAT THOSE CONCERNS THAT ARE FELT TO BE MOST SERIOUS BE RANKED

20. Where do you get MOST of your information about activities at (name site)?

21. Do you feel that you have enough information about the ongoing activities at (Name site)?
PROBE: IF NOT, what kind of information would you like to have?

22. Do you think the information you currently have about ~ame site) and activities at ~ame site) is accurate?
PROBES: Why? Or why not?
Who would you trust to give you accurate information about (Name site) and the activities at (Name site)? IF A VARIETY OF SOURCES ARE MENTIONED, ASK GROUP TO RANK THOSE MENTIONED FROM MOST TRUSTWORTHY TO LEAST TRUSTWORTHY

23. Do you have any particular concerns about the cleanup at (name site)?
PROBES: What concerns do you have?
How serious are your concerns? Why?
Do you think that these things affect you personally?

24. Now I am going to ask you about some specific cleanup activities at (name site). If there's a choice between treating contaminated soil or waste on the site, or having contaminated material transported off-site for treatment, which would you prefer to see happen?
PROBES: Why?

25. Do you think that you and your family would be better off if (name site) stayed open or if it were closed?
    PROBES: How would you be better or worse off.
    Why do you think so?

26. If you could make one recommendation concerning (Name site) to a government official who could actually do something about (Name site), what would that recommendation be?

27. Have you ever heard of the Consortium for Environmental Risk Evaluation (CERE) ?
    PROBES: IF YES, What have you heard?
    Have you heard anything lately? where?

AT THIS POINT, RESPONDENTS ARE TO BE SINCERELY THANKED FOR THE VERY HELPFUL INFORMATION THAT THEY HAVE PROVIDED THROUGHOUT THE SESSION AND TOLD THAT YOU NEED THEM TO DO JUST ONE MORE THING BEFORE THEY LEAVE. TELL THEM THAT IT WILL ONLY TAKE 5 MINUTES. PICK UP THE CARDS ON WHICH THEY LISTED THEIR TOPICS OF LOCAL CONCERN AT THE BEGINNING OF THE SESSION, THEN DISTRIBUTE THE QUESTIONNAIRE. WHEN ALL QUESTIONNAIRES HAVE BEEN COLLECTED AND FINAL INSTRUCTIONS GIVEN, THE GROUP IS DISMISSED

MODERATOR: PLEASE BE EXTREMELY CAREFUL TO LABEL ALL TAPES, GROUPS OF PARTICIPANT PROFILES, GROUPS OF 4 X 6 CARDS, GROUPS OF INFORMED CONSENT FORMS, AND RECORDER CONFIDENTIALITY FORMS WITH THE DATE, TIME, AND LOCATION OF THE GROUP THAT THEY REPRESENT, AS WELL AS WITH THE NAME OF THE MODERATOR OF THAT GROUP. DO THIS IMMEDIATELY FOLLOWING COMPLETION OF EACH GROUP.

DO NOT FAIL TO FEDERAL EXPRESS, OR TO HAVE THE FIELD SERVICE FIRM AT THE SITE FEDERAL EXPRESS, ALL MATERIALS PERTAINING TO EACH GROUP TO XAVIER/CERE IN THE ENVELOPES PROVIDED. IT IS OF THE GREATEST IMPORTANCE THAT ONLY ONE OF THE TWO CONCURRENT AUDIO TAPED RECORDS OF EACH GROUP BE PLACED IN A SINGLE FEDERAL EXPRESS ENVELOPE. TWO SEPARATE FEDERAL EXPRESS SHIPMENTS SHOULD BE MADE, EACH INCLUDING ONLY A SINGLE COPY OF THE RECORD OF THE GROUP DISCUSSION TO GUARD AGAINST LOSS IN SHIPMENT. PARTICIPANT PROFILES, 4 X 6 CARDS, INFORMED CONSENT FORMS, AND RECORDER CONFIDENTIALITY DOCUMENTS SHOULD BE ENCLOSED WITH THE FIRST SET OF TAPES SENT

APPENDIX D
FOCUS GROUP PARTICIPANT PROFILE FORM

FOCUS GROUP PARTICIPANT PROFILE

PLEASE EITHER FILL IN THE BLANK OR CIRCLE THE ANSWER THAT BEST APPLIES TO YOU

1. Are you: Male Female

2. What year were you born? 19__

3. How many years have you lived in this area?_____

4. How many people currently live in your household, including yourself?

   ___ adults over the age of 21

   ___ children and young adults under the age of 21

   Total_____ household members

5. Do you consider yourself to be an environmentalist?
   a. Definitely yes
   b. Yes
   c. Neither yes nor no
   d. No
   e. Definitely not
   f. Not sure

6. Which of the following groups includes your total household income last year?
   a. Less than $16,000
   b. $16,000-$25,999
   c. $26,000-$35,999
   d. $36,000-$45,999
   e. $46,000-$55,999
   f. $56,000 or more

7. Before today's discussion, had you ever heard of the (Name of facility)?
   a. Yes, frequently
   b. Yes, occasionally
   c. Maybe
   d. No

8. Do you know anyone who works at (Name of site)? Please circle all that apply
   a. Yes, a relative or family member
   b. Yes, a friend
   c. Yes, other
   d. No, not that I know of
   e. Don't know

NOW PLEASE TURN SHEET OVER AND ANSWER THE QUESTIONS ON THE BACK

9. How important is it to you personally that the federal government clean up the wastes at (Name of Facility)?

   a. Very. important
   b. Somewhat important
   c. Not very important
   d. Not important at all
   e. Don't know

10. Based on what you know and what you've heard in today's discussion, what do you personally think would be the best way to deal with any hazardous wastes or materials now stored at (name facility')?

    a. Treat them now on the site
    b. Transport them off the site as soon as possible for treatment elsewhere
    c. Store them safely on the site and leave them alone for now

11. Based on what you know and today's discussion, what, if anything, concerns you the most about the activities at (name facility)?

12. What recommendations would you like to make specifically about the cleanup activities at (name facility')?

13. How would you like to be involved in making decisions about the cleanup activities at (name facility)?

14. Do you feel that you have had the opportunity to express all of your concerns about (name facility) in this discussion?

No (IF NO, Please list any other concerns that you might have.)

THANK YOU FOR YOUR ASSISTANCE

APPENDIX E
FOCUS GROUPS USED IN EACH COMPONENT OF THE ANALYSIS

| | Focus Groups | Participant Profiles | Concern Cards |
|---|---|---|---|
| 1.Hanford African-Americans | x | x | |
| 2. Fernald African-Americans | x | x | x |
| 3. INEL African-Americans | x | x | x |
| 4 Oak Ridge African-Americans | x | | x |
| 5 SRS African-Americans (141b) | x | x | |
| 6. SRS African-Americans (140b) | x | x | x |
| 7. SRS African-American (130b) | | x | x |
| 8. SRS African-American | | x | |
| 9. Rocky Flats African-American | | x | |
| 10. Oak Ridge Asian-Americans | x | x | x |
| 11. Hanford Asian-Americans | x | x | x |
| 12. Fernald Asian-Americans | x | x | x |
| 13. SRS Asian-Americans | x | x | x |
| 14. Rocky Flats Asian-Americans | x | x | x |
| 15 INEL Latinos (131b) | x | x | |
| 16 INEL Latinos (112b) | x | x | x |
| 17. Fernald Latinos | x | x | x |
| 18. Rocky Flats Latinos | x | x | x |
| 19. Hanford Latinos | x | | |
| 20. Oak Ridge Latinos | | | x |
| 21. Oak Ridge Downgradient Rural* | x | | x |
| 22. Fernald Appalachians | x | x | x |
| 23. SRS Whites | x | x | x |
| 24. Hanford Downgradient | x | x | x |
| 25. Oak Ridge Downgradient | x | x | |
| 26. INEL Downwinders | x | x | x |
| 27. Rocky Flats Downwinders | x | x | x |
| 28 Oak Ridge Downwinders | x | x | x |
| 29 INEL Downgradient | x | x | |
| 30. Rocky Flats Downgradient | x | x | x |

| | Focus Groups | Participant Profiles | Concern Cards |
|---|---|---|---|
| 31. Fernald Downwinders | x | x | x |
| 32. Fernald Downgradient | x | x | x |
| 33. Hanford Downwinders | x | x | x |
| 34. SRS Santee Native American | ** | | |
| 35. Rocky Flats Native American Citizens | ** | | |
| 36. Rocky Flats Tribal Leaders | ** | | |
| 37. SRS Students (all African American) | | x | |
| 38. SRS Seniors | | x | |
| 39. Hanford Farmer-Ranchers (occupation) | | x | |
| 40. Hanford Seniors | | x | |
| 41. INEL Seniors | | x | |
| 42. INEL Fish Hatcheries (occupation) | | x | |
| 43. Oak Ridge Seniors | | x | |
| 44. Rocky Flats Ranchers | | x | |
| 45. Rocky Flats Seniors | | x | |
| 46. Fernald Seniors | | x | |

* Downgradient, Downwinders, Seniors, and occupational-based groups were comprised of white individuals

** Not included in the content analysis, but qualitatively analyzed. See Chapters 3 and 7.

APPENDIX F
QUESTIONS USED IN ENVIRONMENTAL CONCERN CONTENT ANALYSIS

1. Does this area have much air pollution?
PROBES: What evidence of air pollution do you see, (or what leads you to believe there is not much)? Is it serious? Where do you think it comes from? Does it affect you personally? [#3 on Type B Focus Group Discussion Guide]

2. What about quality of the water in the lakes, streams and rivers around here?
PROBES. What evidence of water pollution do you see? Where do you think it comes from? Does it affect you personally? IF PROBLEMS ARE IDENTIFIED, ASK GROUP MEMBERS TO EXPLAIN WHAT THEY THINK CAUSES THESE PROBLEMS AND HOW SERIOUS THEY THINK THESE PROBLEMS ARE. [#4]

3. Do you, or members of your family, fish? If so, do you eat the fish?
PROBES: Do you thing that the fish in your area are affected by pollution? What makes you think so? What do you think causes this? [#5]

4 Do you hunt? IF SO, do you eat the game?
PROBES: Do you think that the game in your are is affected by pollution? What makes you think so (or not)? What do you think causes this? [#6]

5. Are you aware of any other environmental problems or pollution in the area which may have affected plants or fish and wildlife?
PROBES: What do you think causes these problems? Do you think these problems are serious? [#7]

6. Where does your drinking water come from?
PROBES: Public water systems? private systems? wells? Do you have any concerns about well water around here? If you drink well water, you have your well water tested? Why?
Are there any problems with the quality of your drinking water?
PROBES: What kind of problems? Do you filter your water? Why or why not?
[#9 / #10]

7. All things considered, how would you compare the environmental problems in this are to those in other parts of your state?
PROBES: Do you think that they are more serious, less serious? [#11]

8. How would you compare the environmental problems in your area with those in other parts of the US?
PROBES: More serious? Less serious? Why? [#12]

9. Do you know of anyone in your community whose health has been affected by pollution of any type?
PROBES: What makes you think so? How has their health been affected? What do you think are the sources of these problems? How serious do you think these problems are? [#13]

10. Do you happen to know if any workers in your area are exposed on the job to things that might harm their health?
PROBES: What makes you think so? Where do they work? In what ways do you think these workers' health has been affected? [#14]

11. If you had to name the most important source or sources of pollution in your area, what would that or those be?
PROBES: Why that one? Any others? ASK ABOUT SPECIFIC ACTIVITIES CAUSING POLLUTION IF A COMPANY OR ORGANIZATION IS NAMED HERE. ASK ALSO ABOUT SPECIFIC POLLUTANTS IF THE GROUP NAMES A VARIETY OF IMPORTANT SOURCES OF POLLUTION, ASK THE GROUP TO RANK THOSE NAMED.
IF THE GROUP NAMES THE LOCAL DOE FACILITY, PROBE THEM TO CLARIFY THEIR CONCERNS, ESPECIALLY WHETHER MENTION OF THE DOE FACILITY RESULTS FROM PAST OPERATIONS OR CURRENT OPERATIONS. IF THE DOE FACILITY IS NOT MENTIONED, DO NOT ASK ABOUT IT AT THIS POINT. [#15]

12. IF THE LOCAL DOE FACILITY HAS BEEN MENTIONED BY THE GROUP AT SOME TIME PRIOR TO THIS QUESTION, ASK Some of you have already mentioned (Name site). Before this discussion, what had you heard about (Name site)? IF THE FACILITY HAS NOT BEEN MENTIONED UP TO THIS POINT. ASK How many of you have heard about the Department of Energy sites at (Name site)? READ COUNT INTO TAPE.
PROBES: When I mention (Name site), what is the first thing that comes to mind? What have you heard about the Department of Energy site at (Name site)? Is there any particular thing that concerns you about (Name site)? ONLY IF THEY MENTION PAST PROBLEMS ASK Has anything been done about past problems you have heard of at (Name site)? [#16]

13. How serious do you think the problems are with the wastes at (name site)?
PROBES: What makes you think so? Are there problems with any specific chemicals, materials or substances that you are concerned about? How would you compare these problems with other local problems? [#18]

14. Specifically, what concerns you most about (Name site)?
PROBES: Are you more concerned about the current conditions at (Name site), or about what might happen at the site in the future? Are you more concerned about the storage of certain chemicals, materials or substances at the site, or the migration of any of these things offsite? Are you concerned about any operations or practices at the site? Why?
ASK THAT THOSE CONCERNS THAT ARE FELT TO BE MOST SERIOUS BE RANKED [#19]

15. Do you have any particular concerns about the cleanup at (name site)?
PROBES: What concerns do you have? How serious are your concern? Why? Do you think that these things affect you personally?

APPENDIX G
CATEGORY DEFINITIONS FOR ENVIRONMENTAL CONCERN (TABLE 4-1)

**1. DK -- DO NOT KNOW***

Includes: a. statements that do not know
b. statements that do not know enough

Examples:

1. Moderator: Do you have any ideas [if the waters are contaminated]?

   Man: Not at all.[DK]

   (INEL Latinos)

2. Moderator: What about the quality of the water in the lakes, streams, and rivers around here. Is there evidence of water pollution?

   Man: I've only been down five months so I really couldn't say about the water. I go on in time, I guess I will be able to get into it, but right now I haven't got the foggiest idea. [DK]

   (Savannah River Site African-American)

3. The Facilitator: Some of you have mentioned the clean-ups [at Hanford], I think. What do you know about the cleanup activities at Hanford?

   Man: I don't know anything [DK]

   (Hanford African-American)

**2. NC -- NOT CONCERNED**

Includes: a. indication of a lack of concern (i.e., "You've got more personal things to be concerned about" or "The water tastes good")

Examples:

1. Moderator So you don't perceive any problems with the water?

   Man: No. [NC]

   (Fernald Downwinders)

2. The Facilitator: Does it [air pollution] affect you personally in terms of how you feel or --

   Male Speaker Not I. [NC]

   (Hanford African-American)

3. The Facilitator Have you noticed any difference in the rivers or streams?
   Woman: No, not really. The only thing I know, I know the fish out of the Snake River taste better than the fish our of the Columbia or the--any of the other three rivers. [NC]

   (Hanford African-American)

**3. SLC -- SLIGHTLY CONCERNED**

Includes:
a. Comparisons BETTER(i.e., *better than* it was before or in the past; *better than* other areas)
b. concerned but with qualifier or caveat (i.e , "ours is, as Jeff said, it's very clean unless we have radiation floating in it")
c. anything with contradictions (i.e.,"Clean, but there is that plant near the river that dumps there", etc.)
d. any mention of a word indicating less concern (i.e., "I am a *little* worried,"etc.)

Examples:

1. Woman: I think the situation with Oak Ridge concerns me but it doesn't concern me as much as school safety for my children and her children and anybody else that has children. To me, I want my kids to be safe when they go to school. They spend two-thirds of their day there. As far as I'm concerned, Oak Ridge is a concern, but that's pretty far away for us. [SLC]

   (Oak Ridge Downwinders)

2. Man: This area's a pretty clean place relative to the other cities that I've been in, compared to Memphis, and I've lived in Nashville. It's not as clean. [SLC]

(Oak Ridge Asians)

3. Moderator: Would you say you are more concerned about the storage of certain chemicals or materials or substances at the sites or about the migration offsite. I think Andrea talked a little earlier about these leaking. Are you more concerned with the storage or the fact that it might somewhere else?

Woman: If they put more care. Even if they store here. Even if they put more care, then it is pretty safe [SLC]

(Fernald Asians)

**4. CG -- CONCERNED -- GENERAL**

Includes:
a. concern with no qualifiers
b if an individual heard of people in danger, etc., but in abstract (i.e., "know those people are affected")
c. comparisons WORSE (i e , *worse than* it used to be, *worse than* other areas, etc )
d. mention of radioactivity or cancer by itself
e. questions indicating concern

Examples:

1. Moderator: How serious do you think the problems are with waste materials at Oak Ridge?

Unison: Very serious. [GC]

(Oak Ridge Downwinders)

2. Moderator; As far as all problems that you have been talking about with the air, when I said initially, is there much air pollution, and there were lots of head shaking and mumbling. How serious a problem do you think it is?

Man: Well I think that it is serious and I look a lot of this stuff, you know, when you're trapped on 75 through the middle of Cincinnati and the valleys there, because there is also a lot of carbon monoxide that comes out in the wind. I'm sure that concentrations are high and people are breathing I; that's why I'm guessing that some of the respiratory problems that kids have, and older people have. [GC]

(Fernald Hispanics)

3. Moderator. Dorothy, when I say Hanford, what is the first thing that comes to your mind?

Woman: The life of the tri-city. There's so much stuff that's unknown that makes it hard. But there are more statistics and information available for people, than we are guessing could be this or that. That's the problem you see, the unknown. [GC]

(Hanford Asians)

**5. CP -- CONCERN -- PERSONAL**

Includes: a. KNOWS the receiver (including self, family, friend, or even acquaintance)
b. questions indicating potentially KNOW the receivers (i.e., "What if my little girl got exposed?")

Examples.

1. Man: In respect to drinking water, I've never been happy with it because I grew up on fresh well water and I always liked it and drinking water in the city--I've never been a big fan of it. I live with it because I have to. But, you know . . .

(Rocky Flats Latinos)

2. Moderator: Do you know of anyone else in your community whose health has been affected by pollution of any type, yourselves included?

Man: Well, I grew up in Boston, well not Boston city, but suburbs, grew up there forever and never had a problem. Went to Utah to go to school, never had a problem, came here, all of sudden, within two years I had, you know, sinus problems, allergy problems.

(Fernald Hispanics)

3. Moderator: Do any of you know people whose health has been effected by things on the job that they were exposed to?

Woman. Not on the job, but I have thought about where I live. I have lived there four years. And I have seen each year to be . . . I get sicker and sicker. I catch more colds and so do my children. And so do my neighbors' children. And I think this could be due to air pollution, easily. I know that my mom, personally, is allergic to smoke. She smoked for a long time and she stopped smoking 15 years ago, and in the past five years, she

has noticed that she is more sensitive to air conditioning, if it is a bad air pollutant day out . she seems to be affected by it

(Fernald Appalachians)

**6. CA -- CONCERN -- ACTION**

Includes: a. ACTION--change of behavior

Examples:

1. Man: I don't live very far from Fernald and ever since we found out about Fernald and what was going on there and so forth, we've been buying our water and that's been many years--I guess, five, six, seven years. [CA]

(Fernald Downwinders)

2. Moderator: Okay. Why wouldn't you fish around here?

Woman: I never did like to fish here. [CA]

Moderator: Oh, you never did?

Woman: No, I never did, because they said there was radiation in there, and I was scared of it.

(Hanford African-American)

3. Man: My parents came to visit us and they worry about the water too. We drink distilled water instead of from the tap water. [CA]

Moderator: Because of what?

Man: Because they are afraid that the water might be polluted. But maybe not, it could be . .

(Hanford Asians)

*Example coding in brackets; codes in capital letters.

APPENDIX H
CATEGORY DEFINITIONS FOR CONCERN CARD RESPONSES (TABLE 6-5)

**1. CRIME**

Includes:
a. violence
b. drug use
c. police injustice
d. child abuse
e. general crime

Examples:
1. Black on Black Crime (Savannah River Site African-Americans)

2. Gang Violence (Rocky Flats Latinos)

3. Crime (Fernald Downwind)

**2. EDUCATION**

Includes:
a. school system
b. learning
c. funding
d. dissemination of information in society
e. childrearing

Examples:
1. Education (Fernald Appalachians)

2. Lack of Education of Young Black Males and Females (Savannah River Site African-Americans)

3. Schools (INEL Downwinders)

**3. GOVERNMENT** (requires government intervention)

Includes.
a creation of infrastructure
b taxes
c. politics
d. welfare reform
e health care

f. freedoms
g. rights

Examples: 1. Social Security (Savannah River Site African-Americans)

2. Lack of Public Transportation (Rocky Flats Downgradient)

3. Health Care System (Oak Ridge Asians)

**4. ECONOMY**

Includes: a. jobs
b. unemployment
c. general economy

Examples: 1. Ways of Making More Money (Savannah River Site African-Americans)

2. More Businesses in This Area (INEL Latinos)

3. Jobs (for Minorities) (INEL African-American)

**5. ENVIRONMENT**

Includes: a. air quality
b. water quality
c. potential environmental hazards

Examples: 1. Contamination from Pesticides (Rocky Flats Latinos)

2. Environment from Our Community (Fernald Downgradient)

3. Disappearance of Natural Habitat (Fernald Appalachians)

**6. DOE SITE**

Includes: a. Concerns about economics
b. Concerns about the environment
c. Indistinguishable concerns

Examples: 1. Air from SRS [Savannah River Site]/It's Effect on Us (Savannah River Site Whites)

2. Hanford (Hanford Downwinders)

3. Hanford Budget Shortfall (Hanford Asians)

**7. GENERAL SOCIETY** (all other social issues)

Includes:
a. homelessness
b social values and morality
c. gambling
d. prejudice

Examples:
1. Teen pregnancy (Savannah River Site Asians)

2. Decline of Moral Standards (Rocky Flats Latinos)

3. Racism (Savannah River Site African-Americans)

## APPENDIX I
## CODING RULES FOR ENVIRONMENTAL CONCERN (TABLE 4-1)

Decision Rules:

1. Code each individual statement as ONE mention. Do not break up the comments of any individual.

2. Even if it is obvious that a person is repeating themselves, count each occurrence as a separate mention.

3. If a person agrees with the previous mention this is counted as a mention. This includes any affirmative response including "yes," "yeah," "right," "I agree," etc.

4. If it is unclear to what an individual is referring, it is okay to look at the moderator's comments before as well as the previous statements by respondents to understand THAT mention (only counts as one mention).

5. Only code environmental hazards or concerns (this includes air quality, etc., but not crime, education, etc.).

6. Response order is important. To be consistent, judge by the moderator.
a If the moderator has stated the question in some form, mark it with the number on the protocol.
b. If the moderator has not brought up the question in some form, but the participant speaks about this specific concern, it is not counted.
ex. #1 (air), but participants talk about #2 (water) do not count.
c. If the moderator has brought up the question, then goes to another question, and then comes back to the original question, count it under the appropriate category.
ex. #2 (water), but someone states something about drinking water (#6) and the moderator then starts talking about drinking water, then code as #6; if the moderator goes back to #2, then code as #2.
d. If group members bring up a new topic, but the moderator does not address this further (by the questions in the protocol), then these mentions are not considered.

APPENDIX J
VARIABLE DESCRIPTIONS FOR ENVIRONMENTAL CONCERN
ORDERED PROBIT (TABLE 4-8)

*Dependent Variable*
**ENVIRONMENTAL CONCERN**

Each individual's response to the following question: "Do you consider yourself to be an environmentalist?"

Responses coded as follows:
4 = Definitely yes
3 = Yes
2 = Neither yes nor no*
1 = No
0 = Definitely Not
* There was an additional category in the participant profile, "not sure." This category was included with "neither yes nor no."

*Independent Variables*

**GENDER** Respondent's gender -- Female =1, Male = 0.

**CHILDREN** Number of children and young adults under the age of 21 currently living in respondent's household.

**INCOME** Respondent's self-ranking of income coded as follows:
1 = Less than $16,000
2 = $16,000-$25,999
3 = $26,000-$35,999
4 = $36,000-$45,999
5 = $46,000-$55,999
6 = $56,000 or more

**AGE** Respondent's age in years

**WHITE** Respondent's race -- white = 1, else 0.

**ASIAN-AMERICAN** Respondent's ethnicity -- Asian-American = 1, else 0.

| | |
|---|---|
| **AFRICAN-AMERICAN** | Respondent's race -- African-American = 1, else 0. |
| **HANFORD** | Respondent lives near Hanford -- Hanford = 1, else 0. |
| **INEL** | Respondent lives near INEL -- INEL = 1, else 0. |
| **OAK RIDGE** | Respondent lives near Oak Ridge -- Oak Ridge =1, else 0. |
| **ROCKY FLATS** | Respondent lives near Rocky Flats -- Rocky Flats = 1, else 0. |
| **FERNALD** | Respondent lives near Fernald -- Fernald = 1, else 0. |

SOURCE: All data complied from Focus Group Participant Profiles distributed to individuals at the end of "Type B" focus groups conducted by the Consortium for Environmental Risk Evaluation of Tulane and Xavier Universities for the United States Department of Energy, 1995.

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## BIOGRAPHICAL SKETCH

Born on September 4, 1970, Angela C. Halfacre attended primary and secondary schools in Clemson, South Carolina. In 1988, she majored in political science at Furman University located in Greenville, South Carolina. Angela began graduate studies in 1992. Combining her interests in American and comparative politics, she specialized in environmental politics and policy. During the summer of 1994, Angela worked as a policy specialist for the Florida Department of Environmental Protection. After graduation, Angela will assume the responsibilities of an Assistant Professor of Political Science as well as coordinate the environmental studies program at Albright College in Reading, Pennsylvania.

I certify that I have read this study and that in my opinion it conforms to acceptable standards of scholarly presentation and is fully adequate, in scope and quality, as a dissertation for the degree of Doctor of Philosophy.

Walter A. Rosenbaum, Chair
Professor of Political Science

I certify that I have read this study and that in my opinion it conforms to acceptable standards of scholarly presentation and is fully adequate, in scope and quality, as a dissertation for the degree of Doctor of Philosophy.

M. Margaret Conway
Professor of Political Science

I certify that I have read this study and that in my opinion it conforms to acceptable standards of scholarly presentation and is fully adequate, in scope and quality, as a dissertation for the degree of Doctor of Philosophy.

Lawrence C. Dodd
Manning J. Dauer Eminent Scholar of
Political Science

I certify that I have read this study and that in my opinion it conforms to acceptable standards of scholarly presentation and is fully adequate, in scope and quality, as a dissertation for the degree of Doctor of Philosophy.

Wayne L. Francis
Professor of Political Science

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This dissertation was submitted to the Graduate Faculty of the Department of Political Science in the College of Liberal Arts and Sciences and to the Graduate School and was accepted as partial fulfillment of the requirements for the degree of Doctor of Philosophy.

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